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FACTORS AFFECTING EXPORTS OF UNITED STATES HOG PRODUCTS

By G. B. Thorne and Preston Richards

Washington, D. C.
November, 1932

Business
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FACTORS AFFECTING EXPORTS OF UNITED STATES HOG PRODUCTS

By G. B. Thorne, Agricultural Economist, and Preston Richards,
Associate Agricultural Economist, Division of Statistical
and Historical Research

BB
AUG 26 1953

SUMMARY

The sharp reduction in United States exports of hog products during recent years, and especially during the last two years, has been an important factor in the domestic hog situation. In 1931, only 7 per cent of the total pork and lard produced in the United States found an outlet in foreign markets, whereas from 1920 to 1924, 16 per cent of our production was sold abroad. With our export trade in hog products now near the lowest level in more than a generation and with the future welfare of the hog industry obviously depending in part upon the extent to which foreign markets will provide an outlet for American pork and lard, it appears to be an opportune time to analyze the trends in this export trade. The conclusions that can be drawn as to the future, from an analysis of information now at hand, should be helpful to both producers and packers in making production and marketing adjustments.

Exports of hog products increased greatly during the 19th century, as commercial hog production expanded and facilities for transporting hog products were materially improved. This expansion in production and exports was especially marked in the latter half of the century, but a turn came at the end of the century. From 1900 to 1914, our foreign trade in these products gradually decreased. The World War proved a great stimulus to foreign trade, however, and exports of both pork and lard increased sharply, the greatest increase being in pork. Since 1919 the trend of total exports has been sharply downward, although lard exports continued to increase until 1923. Lard has represented an increasing proportion of our total export trade in hog products during most of the last 50 years.

For many years the United Kingdom and Germany have provided the principal outlets for American hog products. Denmark has been our most important competitor in the British market. Although Germany is an important hog-producing country, its production, especially of lard, is not suffcient to meet the requirements of its own population.

United States exports of hog products since 1900 have been affected greatly by hog production in foreign countries, especially in Germany and Denmark. During the first decade of this century, foreign hog production increased and, as a consequence, United States exports were reduced. During and immediately following the World War, however, foreign production was greatly reduced. This reduction, together with the increased foreign demand for pork by the allied armies, resulted in the sharp increase in United States exports of hog products. The cessation of the war demand, and the

marked expansion in foreign hog production during the decade 1921-1930 to a level even higher than that of prewar years, largely accounts for the marked downward trend in our exports in recent years.

Our exports are also affected to some extent by production in the United States. When hog production in this country increases there is a tendency for exports to increase, and when production is reduced, exports tend to decrease. Hog production at home and abroad accounts for practically all of the yearly variations in total exports of hog products during the marketing years 1921-22 to 1930-31. This fact indicates that the changes in consumer purchasing power in the United States were sufficiently similar to those in Europe to cause exports to vary almost entirely in accordance with changes in supplies. Although there have been periods in the history of our pork and lard export trade when governmental regulations have been an important factor affecting the total volume of hog products exported, this was not the case during the decade from 1921 to 1930, except to the extent that such regulations affected European pork production.

Expansion in foreign hog production has affected our export trade in pork much more than it has our lard exports. Although pork exports may increase somewhat during the next two years as a result of reduced foreign supplies, it is unlikely that this country will regain in that time much of the foreign trade in pork, which has been lost in recent years. Over a longer period, it is not improbable that pork exports will reach even a lower level than that which now prevails.

A study of our export trade in hog products during the last 50 years shows clearly that our present restricted foreign outlet for pork has been brought about largely through a resumption of the trends that were in evidence prior to the World War. Obviously, pork exports could not remain at or near the abnormally high level of 1917 to 1920 after European agriculture readjusted itself from the abnormal developments caused by the war. The rapid increase in hog production in those countries during recent years to and beyond prewar levels represents a restoration of the industry to what would have been its normal situation if the war had not occurred. It is probable that exports of pork would have continued to decline steadily had it not been for the World War.

The export situation in lard is different from that in pork. The United States is still the principal lard producing and exporting country, and it probably will continue to retain that position. This country produces a surplus of lard largely because of the adaptability of the Corn Belt to the production of lard-type hogs. Because of the low yield of lard from hogs produced in European countries, and the established position of American lard in British markets, foreign competition is not so severe in lard production as it is in pork production. There has been a marked expansion in the production of other oils and fats during recent years, and the consumption of such products has increased in all of the important consuming countries. Most of the effect of this increased competition on lard apparently has been in reducing the world level of lard prices, rather than in affecting the volume of lard handled in international trade. The superior quality accredited to American lard in foreign markets apparently has been an important factor in the maintenance of the United States lard

export trade. The decline in lard prices has been somewhat greater than the decline in pork prices during recent years, but so far as export trade is concerned, this country holds a much more advantageous position in lard production than in pork production.

PORK AND LARD EXPORTS PRIOR TO 1900

For nearly two centuries the American hog industry has been on an export basis. Records show that in the 18th century the colonies produced a surplus of pork which was traded to the West Indies. The New England colonies were the first to export pork products, but later New York, Pennsylvania, Virginia, and the Carolinas became important in this respect. With the beginning of the 19th century, the industry expanded and moved westward. A larger proportion of its production passed into commercial channels and exports of hog products gradually increased. Although the West Indies, especially Cuba, remained an important market for American pork, England and continental Europe soon became the leading export outlets.

During the first part of the 19th century the pork export trade fluctuated considerably as a result of frequent interference from wars, embargoes and other restrictions. The development of railroad transportation after 1830 made possible a greater westward expansion of the industry, and as a result, production and exports both increased. However, it was not until the decade beginning with 1840 that exports of hog products became relatively large. From 1840 to the Civil War the trend was upward but there was considerable fluctuation from year to year. Even in this early period there was a marked tendency for exports to exhibit cyclical fluctuations, which presumably were a reflection of the cyclical changes in hog production.

During the Civil War the normal outlet provided by the Southern States for a large share of surplus pork and lard produced in the North was temporarily closed, and as a consequence, a great need for new market outlets developed. This unusually large surplus of hog products in the North combined with a shortage of foodstuffs in Europe resulted in the development of an extensive trade with England during the war years. Although pork and lard exports declined to the previous level for a brief period following the close of the war, the expansion in the export trade during the war had demonstrated clearly the possibilities of a foreign outlet for surplus hog products of the United States, and it apparently served as an opening wedge to the broad outlet for American pork and lard in Europe which developed rapidly during the following years. (See fig. 1.)

The early seventies marked the beginning of an upward trend in exports of hog products which carried that trade beyond all previous levels. In 1870 only about 100,000,000 pounds of pork and lard were exported, but by 1880 the volume had increased to nearly 1,250,000,000 pounds. During the period from 1882 to 1889, however, exports declined somewhat because of various restrictions to trade, such as embargoes, tariffs, etc., in European countries. But in the following decade these restrictions were modified, and exports again increased greatly, reaching the high level of 1,700,000,000 pounds in 1899. The United Kingdom and Germany were the principal importers of American pork and lard during this period, as they have been in recent years.

The phenomenal growth in export trade during the latter part of the 19th century was brought about by a combination of factors. Increased immigration resulted in a rapid development of the Middle West with its new and cheap lands, and hog production was greatly increased. Improved and cheaper transportation facilities all along the line from the centers of production to the principal foreign markets enhanced the competitive position of American hog producers as compared with producers in Europe. In addition, the constantly growing population in European industrial centers increased the demand for foodstuffs, and the relatively low price of pork as compared with other meats, gave it a favored position in supplying this increased demand.

Although the trends in exports of nearly all kinds of hog products during the 19th century were somewhat similar, a few important changes occurred in the proportions of the different kinds of hog products exported. Lard was not of major importance in export trade in hog products until about 1820, but during the remainder of the century, lard exports increased steadily. From 1820 to 1880, pork exports were usually two or three times as large as lard exports. From 1880 to 1900, when pork imports into Europe were greatly restricted by governmental regulations, the proportion of lard in the total exports gradually increased, and at the end of the century, pork exports were only about 30 per cent larger than those of lard. Changes in these proportions since 1900 will be considered in greater detail in a subsequent section of this report.

During the first half of the century most of the pork exported was salted and pickled, but during the Civil War, bacon, hams, and shoulders became important items, and a considerable part of the large increase in exports of hog products from 1870 to 1880 was in these cuts. Since 1860 exports of salted and pickled pork have been of minor importance. In contrast to the relatively large exportations of live cattle and sheep during the 19th century, exports of live hogs were never of great importance.

PORK AND LARD EXPORTS, 1900 to 1931

Prior to the beginning of the present century, the most important factors affecting United States exports of hog products were domestic production and governmental regulations. The upward trend in both exports and commercial hog slaughter from 1880 to 1900 was marked. (Fig. 1.) Likewise the cyclical fluctuations in hog production were reflected in the volume of exports.

The marked expansion in our export trade of hog products was checked at the beginning of this century, and from 1900 to 1910 the trend was downward despite the continued increase in hog slaughter. The decline in exports in this period was due both to increased European hog production and to a renewal of the earlier import restrictions in some countries.

The effect of governmental restrictions to pork imports in European countries upon United States exports of pork has been mentioned. An important wave of these regulations was initiated in 1879, when Italy, for alleged sanitary reaons, prohibited the importation of hogs and pork products. Portugal and Hungary followed in 1879; Spain and Germany in 1880; France, Turkey, and Roumania in 1881; Greece in 1883; and Denmark in 1888. In most countries the prohibitions did not include rendered lard. The restrictions in Germany and France were most injurious to United States trade.

The principal reason for the restrictions given by foreign Governments was that the presence of trichinae had been discovered in the imported pork products, and that a thorough inspection of importations was not practicable. The only hope for modification of these regulations apparently was for the exporting countries to insure a satisfactory inspection of the pork products before export. Largely to improve our export trade, Congress passed laws in 1890 and 1891 providing for ante-mortem and post-mortem inspection of all livestock slaughtered for export or interstate trade, and for microscopic examination of pork for export.

As a result, the import restrictions were modified in nearly all European countries during the decade that followed. By the end of the century, however, another movement for restriction of imports was initiated. These restrictions consisted of more rigid sanitary measures and increased import duties. In 1900 Germany enacted regulations requiring the inspection of imported livestock both before and after slaughter. This applied chiefly to cattle and beef, but another part of the regulations prohibited the importation of canned meat and sausages. In 1903 the use of borax as a preservative in the curing of meats imported into Germany was prohibited. This made exportation of cured pork from United States to Germany very difficult. Other European countries adopted more drastic restrictions to imports of meats. Regulations adopted in France required the following for imports of pork and pork products: (1) Entry at one of six ports, (2) certificate of inspection, and (3) re-inspection at the port of entry at the cost of the consignee. In 1908, more stringent regulations of meat imports into Great Britain were authorized by an act of the British Parliament.

Restrictions in the form of increased tariffs were adopted in nearly all countries of continental Europe during this period. During 1905, new tariffs were put into effect in several European countries. In that year Germany increased tariff rates on all meats, and this measure, with the earlier one prohibiting the use of borax in curing, practically excluded American cured-pork exports from the German market.

During this period considerable agitation was developed in the United States concerning numerous packing-house methods and the preparation of various meat products over which the Government, under the terms of the old inspection laws, had no control. To remedy this situation, Congress passed an inspection law in 1906 extending the inspection to slaughter houses and to the preparation of sausages, canned, and cured meats. Sufficient funds were provided to extend the inspection to more establishments. In view of the fact that the meat inspection laws of 1890 and 1891 had resulted in modification of the European restrictions upon imported meats, it was hoped that the new law of 1906 would also cause foreign countries to modify their more recent restrictions. Results were disappointing in this regard. In 1907, microscopic examination of pork for export was discontinued. This inspection had been provided for the purpose of detecting the presence of trichinae, but it did not prove successful.

Although the European restrictions to meat importations were apparently adopted largely as a safeguard to the health of consumers, they also served to stimulate hog production in Europe. Restrictions after 1900 were to some extent for health protection, but they were largely designed to encourage hog production in the countries making the restrictions. Encouragement of the hog industry was the primary purpose of the tariffs on pork

and hogs. These various barriers to imported meats established by European countries from 1880 to 1910, while detrimental to the United States export trade for pork, were of considerable indirect benefit to the livestock industry of this country in providing an effective stimulus for the adoption of meat inspection laws. This was especially true with respect to the inspection laws passed in 1890 and 1891, and the renewal of the prohibitions after 1900 were no doubt an important consideration in the enactment of the legislation in 1906 providing for more adequate inspection of meats and meat products produced for international and interstate trade.

During the decade following 1910, exports increased at an accelerated rate, owing largely to the increased demand for pork on the part of the allied European countries engaged in the World War. The increase in exports during this period was much greater for pork than for lard. Pork exports increased from 324,000,000 pounds in 1910 to 1,878,000,000 pounds in 1919, the movenent in the latter year being the largest on record. Lard exports increased from 382,000,000 pounds to 789,000,000 pounds during the same period, and continued to increase until 1923, when the yearly total reached the record figure of 1,075,000,000 pounds.

The trend in exports has been downward since 1919 for pork, and since 1923 for lard, the rate of decline being much greater for pork than for lard. In 1931, pork exports amounted to only 193,000,000 pounds as compared with 314,000,000 pounds in 1930 and the 5-year prewar average (1910-1914) of 422,000,000 pounds. Lard exports in 1931 totaled 601,000,000 pounds as against 674,000,000 pounds in 1930 and 519,000,000 for the 5-year prewar average. Total exports of pork and lard in 1931 were the smallest for any year in the 32-year period except in 1910 when they were only slightly smaller than those of 1931.

The importance of this decline in export trade to the swine industry can be more adequately appraised by expressing exports as a percentage of domestic production. The proportion of production that has been exported annually fluctuated widely during the 32-year period but the trend was downward for both pork and lard. (Fig. 2.) The proportion of domestic supplies of lard sold abroad during this period was largest in 1905, and the second largest proportion was in 1921. The sale of the largest share of the pork supply in foreign markets was in 1918 and 1919, when it was far above that of other years. Lard production in 1931 amounted to 2,385,000,000 pounds and only 25 per cent of it was sold abroad. About 8,907,000,000 pounds of pork were produced in 1931, but only 2 per cent of this supply was exported. Exports of pork and lard combined, constituted only 7 per cent of total pork and lard production in 1931, as compared with the 5-year average, 1920 to 1924, of 16 per cent, and the average from 1910 to 1914 of 12 per cent. Those proportions of the total United States production of pork and lard exported annually do not indicate the full importance of our export trade in hog products to the United States hog industry. All of our exports of pork and lard are obtained from federally inspected slaughter and this slaughter since 1900 has represented from 40 to 65 per cent of the estimated total slaughter. Most of the commercial slaughter of hogs is slaughtered under Federal inspection. During 1931 lard exports constituted 38.7 per cent of the lard produced under Federal inspection and pork exports were 3.4 per cent of the federally inspected pork production.

UNITED STATES: EXPORTS OF HOG PRODUCTS* 1865-1931 AND COMMERCIAL HOG SLAUGHTER, 1880-1931

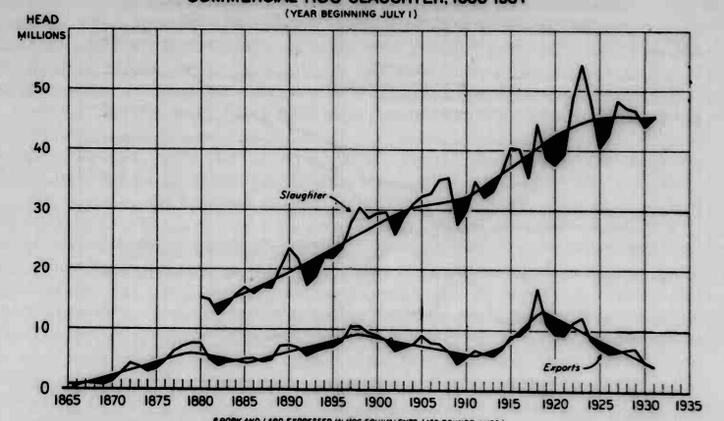


FIGURE 1 - UNITED STATES EXPORTS OF HOG PRODUCTS DURING THE LAST 60 YEARS HAVE TENDED TO MOVE IN CYCLES CORRESPONDING TO CYCLES IN DOMESTIC-SLAUGHTER SUPPLIES. TRENDS IN EXPORTS AND DOMESTIC SLAUGHTER HAVE BEEN QUITE DIFFERENT. PRIOR TO 1900, TREND IN EXPORTS WAS UPWARD, EXCEPT FOR A BRIEF PERIOD IN THE 80'S WHEN CHECKED BY GOVERNMENTAL RESTRICTIONS TO TRADE. EXCEPT FOR LARGE INCREASE DURING 1914 TO 1920, CAUSED BY THE WAR DEMAND, THE TREND IN EXPORTS HAS BEEN DOWNWARD SINCE 1900, LARGELY BECAUSE OF INCREASED EUROPEAN HOG PRODUCTION AND A REVIVAL OF THE EARLIER RESTRICTIONS TO TRADE

UNITED STATES: EXPORTS OF PORK AND LARD EXPRESSED AS A PERCENTAGE OF TOTAL PRODUCTION, 1900-1931

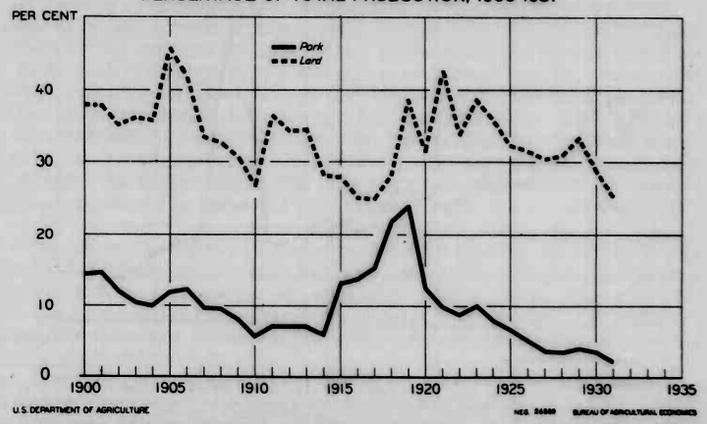


FIGURE 2 - THE PROPORTION OF THE PRODUCTION OF PORK AND LARD IN THE UNITED STATES WHICH HAS BEEN EXPORTED ANNUALLY SINCE 1900 HAS FLUCTUATED WIDELY, BUT THE TREND HAS BEEN DOWNWARD FOR BOTH PRODUCTS. THE PROPORTION OF DOMESTIC SUPPLIES SOLD IN FOREIGN MARKETS DURING THIS PERIOD WAS LARGEST IN 1905 FOR LARD AND IN 1919 FOR PORK. IN 1931 ABOUT 25 PER CENT OF THE NATIONAL LARD SUPPLY AND ONLY 2 PER CENT OF THE PORK SUPPLY WERE EXPORTED

INSPECTED HOG SLAUGHTER IN GERMANY AND DENMARK, AND UNITED STATES EXPORTS OF HOG PRODUCTS,* 1911-1931

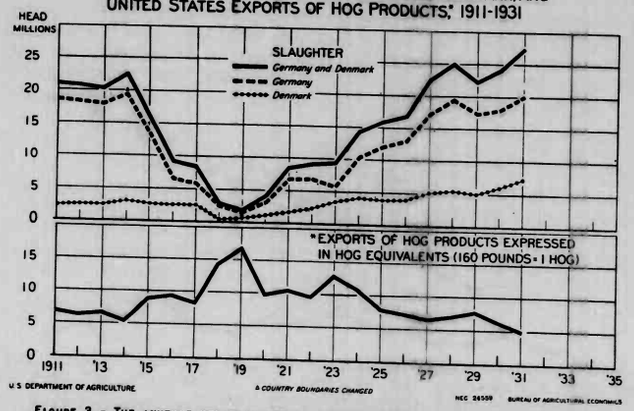


FIGURE 3 - THE INVERSE RELATION BETWEEN HOG SLAUGHTER IN GERMANY AND DENMARK, AND UNITED STATES EXPORTS OF HOG PRODUCTS, INDICATES EFFECT OF COMPETITION FROM EUROPEAN COUNTRIES UPON OUR EXPORT TRADE IN HOG PRODUCTS. HOG SLAUGHTER IN GERMANY AND DENMARK WAS AT A RELATIVELY HIGH LEVEL JUST BEFORE THE WAR, BUT DURING THE WAR PERIOD, SLAUGHTER SUPPLIES DECREASED MATERIALLY. OUR EXPORTS INCREASED SHARPLY DURING WAR YEARS, OWING TO THE UNUSUALLY STRONG DEMAND IN WHICH DECLINE IN EUROPEAN HOG PRODUCTION WAS A FACTOR. SINCE 1920, HOG SLAUGHTER IN GERMANY AND DENMARK HAS INCREASED GREATLY, AND TREND OF OUR EXPORTS OF HOG PRODUCTS HAS BEEN SHARPLY DOWNWARD

UNITED STATES: RATIO OF PORK EXPORTS TO LARD EXPORTS, 1876-1931

(1876-1899-YEAR BEGINNING JULY 1; 1900-1931-CALENDAR YEAR)

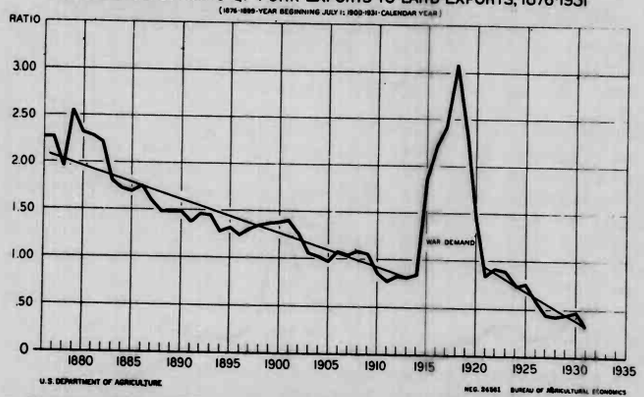


FIGURE 4 - EXCEPT FOR THE PERIOD 1914 TO 1918, WITH ITS STRONG WAR DEMAND FOR PORK, THE RELATIVE IMPORTANCE OF PORK AS COMPARED WITH LARD IN OUR EXPORT TRADE DECLINED STEADILY FOR YEARS. THE TREND OF THE RATIO OF PORK EXPORTS TO LARD EXPORTS WAS GRADUALLY DOWNWARD FROM 1878 TO 1914. THE RATIO INCREASED GREATLY FROM 1914 TO 1918, BUT THE SHARP DECLINE FROM 1918 TO 1921 BROUGHT IT BACK TO THE 1914 LEVEL. SINCE 1921, THE RATIO HAS CONTINUED ITS DECLINE. IN 1931, PORK EXPORTS WERE ONLY ONE-THIRD AS LARGE AS LARD EXPORTS; IN 1921, THEY WERE 85 PER CENT AS LARGE. THESE CHANGES CAN BE EXPLAINED LARGELY BY HOG-PRODUCTION TRENDS IN EUROPE

Marked changes in hog production in foreign countries has been the major factor affecting exports of United States hog products during the last 20 years. Most of the foreign competition which this country has encountered in its export trade in hog products has been from Germany and Denmark. 1/ Although Germany has been and still is on an import basis for hog products it ranks next to the United States as a commercial hog producing country. Denmark produces the largest exportable surplus of pork of any country in the world and its exports constitute about two-thirds of its production. The Netherlands, Poland, Canada, and a few other countries have been producing pork for international trade, but they have been of much less importance in such trade than Denmark.

The inverse relation between hog slaughter in Germany and Denmark and exports of hog products from the United States indicates the effect of competition from European hog production upon exports of hog products in this country. (Fig. 3.) Hog slaughter in Germany was at a relatively high level immediately prior to the World War, but during the period from 1915 to 1919 slaughter in that country decreased materially and in 1920 it was only 17 per cent of the prewar (1910-1914) level. Slaughter in Denmark also declined during the war years, but most of the decrease occurred in 1918 when slaughter in that country reached the low point of the war period. United States exports of hog products increased sharply during these years. This increase was due to the abnormal war demand in which the decline in hog production in some European countries was an important factor. The decrease in slaughter supplies in Germany, however, was not of any material importance in this respect, since practically no pork and lard was exported to Germany from 1914 to 1918.

Since 1919 hog slaughter in Germany and Denmark has increased greatly and with few interruptions. In 1931 slaughter in these countries was the largest on record. Hog production in Germany during the last 12 years has been gradually getting back to the prewar level. The expansion in Denmark has not only carried production up to the level which prevailed prior to the war, but to a point far beyond all previous production peaks. This marked expansion in Denmark has been closely associated with the developments of the dairying industry in that country. Hog production and dairying are very closely interrelated in Denmark because of the widespread and economical use of skim milk in the hog ration. This marked expansion in European hog production accounts to large degree for the large sharp downward trend in exports of hog products from the United States during the postwar period.

The relative importance of pork as compared with lard in our export trade has been decreasing steadily for many years, except for the period from 1914 to 1918 when there was an unusually strong demand for pork as a result of the war. (Fig.4.) The ratio of pork exports to lard exports moved gradually downward from 1878 to 1914. The ratio increased greatly

1/ In the foregoing statements and those to follow, when total exports from United States are related to slaughter in Germany and Denmark it is not meant to infer that all of our exports of hog products go to Europe, but rather that slaughter in those two countries is an accurate index of foreign competition in its effect on our total export trade in these products. The extent of the direct influence of European slaughter is indicated by the fact that about two-thirds of the United States exports have been consigned to United Kingdom and Germany alone during the last decade.

for 1914 to 1918 as a result of the war demand for pork and the cessation of lard exports to Germany, but the sharp decline from 1918 to 1921 brought the ratio back to the 1914 level. Since 1921 the downward trend in the pork-lard export ratio has been more marked than that which prevailed from 1900 to 1914. In 1931 pork exports were only one-third as large as those of lard, whereas in 1921 they were 85 per cent as large. In 1919 pork exports were the largest on record and about two and one-half times as large as the exports of lard.

These fluctuations in the importance of pork in our export trade in hog products can also be explained largely by hog production trends in Europe. From 1900 to 1914, and from 1921 to 1931 when the trend of European hog production was upward, the trend of the pork-lard export ratio was downward, but during the war period, when production in all of the principal hog-producing countries of Europe fell to a very low level, the ratio of pork exports to lard exports increased sharply. This inverse relation can be accounted for by the fact that foreign hog production affects pork exports much more than it affects lard exports. The yield of lard from the types of hogs produced abroad is relatively small, and there is some evidence that it has been decreasing during the last 30 years.

There has been a distince tendency also for pork and lard exports to increase and decrease in accordance with corresponding changes in domestic production, even though foreign production is the most important factor affecting such exports. For instance, during 1923, United States exports and total hog slaughter in Germany and Denmark both moved upward rather than moving in opposite directions. (Fig. 3.) During that year there was a substantial increase in hog slaughter in the United States.

A more detailed study of the total export movement of hog products during the last 10 years shows the extent to which yearly variations in exports can be accounted for by changes in slaughter supplies. 2/ In the upper section of Figure 5, German and Danish slaughter (horizontal scale) has been plotted against United States exports of hog products (vertical scale). 3/ The diagonal line, running from the upper left hand corner to the lower right hand corner of the illustration indicates the average relation between United States exports and German and Danish slaughter. The exports were greater or smaller in some years than this relation indicates. For example, in 1921 exports fell short, by 300,000,000 pounds. of the quantity indicated by the average relation between German and Danish hog slaughter and United States exports; whereas, in 1922 United States exports exceeded, by 200,000,000 pounds, the quantity indicated by the foreign slaughter in that year. The quantities by which exports exceeded or fell short of what would be expected in view of the number of hogs slaughtered in Germany and Denmark in the

2/ The marketing years 1921-22 to 1930-31 were selected for correlation analysis. For the sake of simplicity, the calendar year in which the marketing year began is used in referring to the marketing year. For example "1921" refers to marketing year beginning October 1, 1921.

3/ For instance, the German and Danish slaughter in 1921 of 9,677,000 hogs was plotted against United States exports during that year of 1,376,000,000 pounds to derive the point labeled "21". That point represents the intersection of two imaginary lines extended perpendicularly from the points on the horizontal and vertical scales representing the above values.

respective years were found to be related to domestic slaughter, as shown in the lower section of Figure 5. 4/ The average influence of domestic production on exports is indicated by the diagonal line which passes close to all the points in that section of the illustration. 5/ These two relations indicate, then, that the variations in exports are almost completely accounted for by the changes in hog slaughter at home and abroad, and that foreign slaughter has been a more important factor affecting exports during this period than has domestic slaughter.

This analysis, as well as most of the others contained in this report, indicate that changes in foreign and domestic supplies explain most of the variations in exports of hog products. This fact indicates that, although consumer demand both in this country and in foreign countries changed materially during the period, the similarity of the changes at home and abroad was sufficient to cause supplies to be the principal variables associated with changes in exports. It should be noted that the study herein presented is designed only to show the factors which govern the volume of hog products exported. This is to be distinguished from an analysis of the factors affecting the foreign demand for such products, which would involve a consideration, not only of the volume exported, but also of the prices received for the hog products sold abroad. While a complete analysis of the factors affecting the foreign demand for hog products is beyond the scope and purposes of this study, the results presented are, for the most part, essential preliminary steps to such an analysis and thus form the basis for further research on that subject.

The analysis presented in Figure 5 was concerned with total exports of hog products. The total exports were then diyided into two classes - pork exports and lard exports - and a similar procedure to that shown in Figure 5 was followed in studying the factors related to the variations in each of these two classes of hog products. The results are shown in Figures 6 and 7. The year-to-year changes in pork exports are closely related to German and Danish inspected hog slaughter, and to United States inspected slaughter. The variations in lard exports are almost completely explained by variations in hog slaughter in Germany and lard production from inspected slaughter in the United States. It may be observed that in the analysis of lard exports, hog slaughter in Denmark was not considered as a factor. Lard production in that country is relatively small, and it has had but little

4/ Thus for 1922, United States hog slaughter, amounting to 8,750,000,000 pounds dressed weight, was plotted against the plus deviation of exports shown in Section A of 200,000,000 pounds.

5/ Most of the variations in exports have thus been accounted for by variations in German and Danish hog slaughter and United States hog slaughter. The unexplained variation for any one year is indicated by the extent to which the points in the lower section of the figure deviate from the line of relation. For any one year the algebraic sum of the readings from the two diagonal lines and the deviation of the points from the line of relation in the lower section is equal to the total exports for that year. The method used in the studies shown in subsequent figures is essentially the same as the one just described. For further details concerning this method, see "A Simplified Method of Graphic Curvilinear Correlation" by L. H. Bean, Journal of the American Statistical Association, December, 1929, and "Application of a Simplified Method of Correlation to Problems of Acreage and Yield Variations," by L. H. Bean, Journal of the American Statistical Association, December, 1930.

effect on United States lard exports during the last decade.

Although the international trade in lard by individual countries will be considered in detail in a later section of this report, the destination of United States lard exports is of importance in connection with the analysis shown in Figure 7. On the average, about 60 per cent of the United States lard exports go to the United Kingdom and Germany. During the last decade, exports to the United Kingdom have been very stable. Exports to Germany have declined sharply during this period, however, largely as a result of increased lard production in that country. It is apparent, therefore, that a large proportion of the variations in United States total lard exports since 1921 have been due to the unfavorable developments in the lard trade with Germany.

The analysis of the lard export movement is further complicated because of the increasing competition of other fats and oils with lard in both domestic and foreign markets. The production and utilization for food purposes of vegetable, fish, and marine oils and fats has been increasing for many years, and the development has been especially rapid during the last decade. Most fats and oils lend themselves to numerous technical processes, by which their physical properties can be modified, and as a result they are interchangeable for different uses to a great degree. Although the numerous fats and oils can not all be utilized for the same purposes, they are inter-related over such a wide range that competition among them is both direct and indirect. The fact that many of the fats and oils are either by-products or joint products makes the problem increasingly complex. Statistics relating to fats and oils are somewhat inadequate, because the production, exports, and imports are reported either as oils, refined or unrefined, or as oleaginous raw materials. It is difficult to summarize and compare one period with another.

In considering the effect of the increased consumption of these fats and oils on the international lard trade, the situation in each of the more important lard-consuming countries should be taken into account. The study of the problem has been confined to the United States, the United Kingdom and Germany because of a lack of data for other countries. These countries are of predominating importance in the world lard trade, and they are the leading consumers of fats and oils other than lard.

At the outset, several factors with respect to lard production and consumption should be recognised. Lard is a by-product of the hog industry, consequently the volume produced is determined to some extent by factors somewhat remote from the lard situation. Lard is eaten, at least partly, for its flavor, or for the flavor that it imparts to the products in which it is used; therefore, it has a fairly definite place in the composition and preparation of many foods. Another important factor is that the quality of American lard apparently has given it a preferred position as compared with lard produced in other countries as well as with lard compounds and substitutes.

Consumption of lard in the United States during the last 30 years has varied somewhat in line with changes in hog production. During the first two decades of the century no sustained changes in the trend of the per capita consumption of lard occurred, but during the last 10 years the level

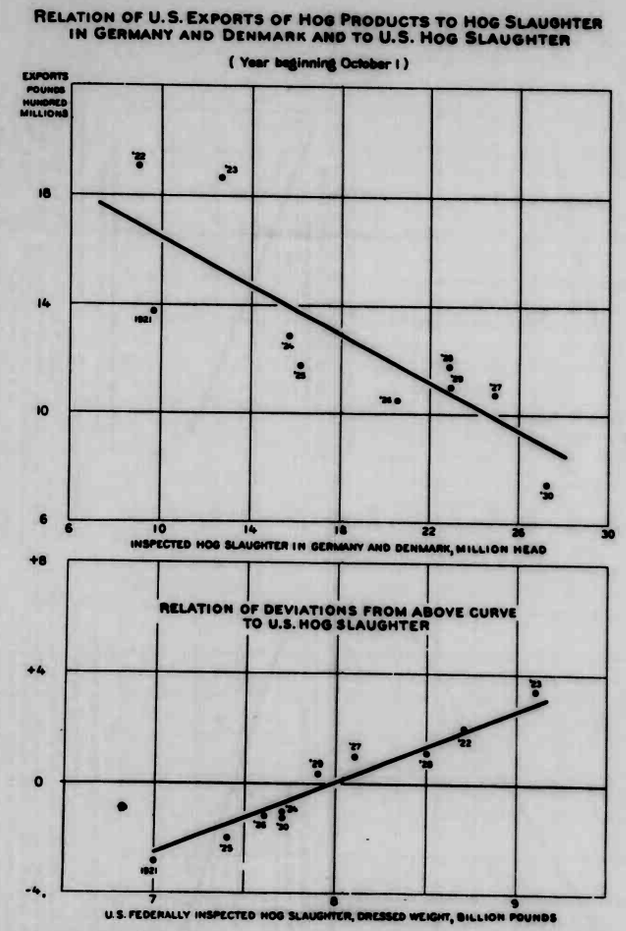


FIGURE 5 - THE YEARLY VARIATIONS IN UNITED STATES EXPORTS OF HOG PRODUCTS DURING THE POSTWAR PERIOD ARE ALMOST COMPLETELY ACCOUNTED FOR BY CHANGES IN INSPECTED HOG SLAUGHTER IN THE UNITED STATES AND IN GERMANY AND DENMARK. INCREASE IN DOMESTIC SLAUGHTER OR DECREASE IN FOREIGN SLAUGHTER TENDS TO INCREASE EXPORTS; AND DECREASE IN DOMESTIC SLAUGHTER OR INCREASE IN FOREIGN SLAUGHTER TENDS TO REDUCE EXPORTS. FOREIGN SLAUGHTER HAS BEEN A MORE IMPORTANT FACTOR AFFECTING EXPORTS DURING THIS PERIOD THAN HAS DOMESTIC SLAUGHTER

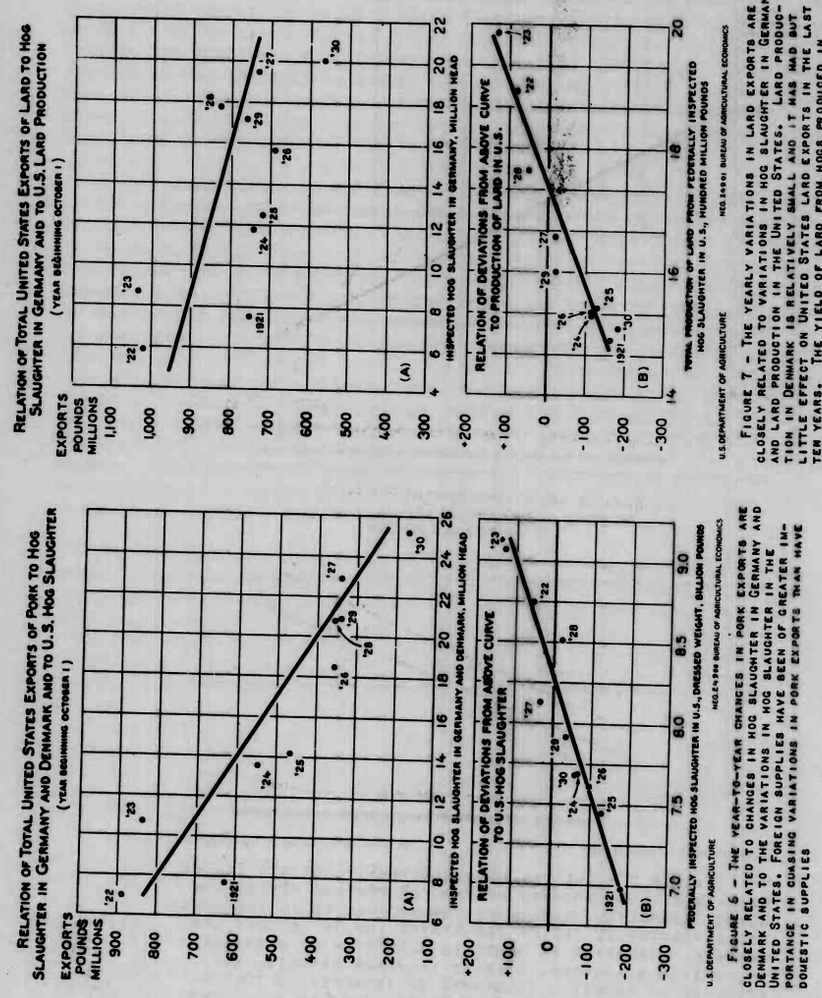

Relation of Total United States Exports of Lard to Hog Slaughter in Germany and to U.S. Lard Production
(Year beginning October 1)
Exports Pounds Millions
Inspected hog slaughter in Germany, million head
(A)
Relation of Deviations from Above Curve to Production of Lard in U.S.
Total production of lard from federally inspected hog slaughter in U.S., hundred million pounds
(B)
U.S. Department of Agriculture
Neg. 5490 Bureau of Agricultural Economics

FIGURE 7 - THE YEARLY VARIATIONS IN LARD EXPORTS ARE CLOSELY RELATED TO VARIATIONS IN HOG SLAUGHTER IN GERMANY AND LARD PRODUCTION IN THE UNITED STATES. LARD PRODUCTION IN DENMARK IS RELATIVELY SMALL AND IT HAS HAD LITTLE EFFECT ON UNITED STATES LARD EXPORTS IN THE LAST TEN YEARS. THE YIELD OF LARD FROM HOGS PRODUCED IN EUROPE IS MUCH LOWER THAN THAT FROM HOGS PRODUCED IN THE UNITED STATES. THEREFORE, FOREIGN COMPETITION IN LARD IS LESS IMPORTANT THAN IT IS IN PORK

Relation of Total United States Exports of Pork to Hog Slaughter in Germany and Denmark and to U.S. Hog Slaughter
(Year beginning October 1)
Exports Pounds Millions
Inspected hog slaughter in Germany and Denmark, million head
(A)
Relation of Deviations from Above Curve to U.S. Hog Slaughter
Federally inspected hog slaughter in U.S., dressed weight, billion pounds
(B)
U.S. Department of Agriculture
Neg. 6394 Bureau of Agricultural Economics

FIGURE 6 - THE YEAR-TO-YEAR CHANGES IN PORK EXPORTS ARE CLOSELY RELATED TO CHANGES IN HOG SLAUGHTER IN GERMANY AND DENMARK AND TO THE VARIATIONS IN HOG SLAUGHTER IN THE UNITED STATES. FOREIGN SUPPLIES HAVE BEEN OF GREATER IMPORTANCE IN CAUSING VARIATIONS IN PORK EXPORTS THAN HAVE DOMESTIC SUPPLIES

of lard consumption per capita has been higher than formerly. In the United Kingdom, lard imports, which constitute a very large proportion of the total consumption, have not varied greatly since 1900. In Germany, where on the average about half of the lard consumed is imported, available figures indicate that the trend in consumption of lard has been fairly stable during the postwar years. Imports of lard into Germany have decreased steadily during these years, but the decrease has been slightly more than offset by the increased domestic production in Germany.

Consumption of edible fats and oils, other than lard in the United States, as indicated by total disappearance, has increased fairly steadily during the last decade. (Table 3, page 42.) No definite figures on consumption are available for the United Kingdom and Germany, but net imports of edible fats, oils, and oleaginous raw materials into both countries show a rather marked upward trend during this period. Since the production of oleaginous raw materials is relatively small in these countries, net imports are probably a fairly satisfactory index of consumption. For any one year, however, this measure might prove inaccurate, since the fats and oils might not all be consumed during the year in which the importations occurred. The fats-and-oils situation in the United Kingdom and Germany in many respects is apparently similar to that in the United States, but some important differences in the developments in Europe and United States should be noted. In this country most of the increased consumption of fats and oils has been in vegetable oils, especially cottonseed oil, and in the form of lard compounds. On the other hand, in Europe the increase has been in both vegetable and marine oils, and has taken the form of butter substitutes to a greater extent than in the United States.

It is impossible to state conclusively just what effect the increased consumption of vegetable, fish, and marine oils has had on the international lard trade. During the last 10 years, changes in lard consumption and exports in the United States have been more in line with changes in hog production in this country and in European countries than with changes in the production of other fats and oils. In the United Kingdom and Germany lard consumption has been relatively stable despite the increased consumption of the "other fats and oils". Imports of lard into the United Kingdom have not changed materially during the decade, but imports into Germany have declined steadily while lard production has increased in that country. The above evidence indicates that changes in lard exports and imports of the three countries under consideration have not been closely associated with the changes in the consumption of other fats and oils during the last 10 years.

Apparently, an increase in the consumption of total fats has occurred instead of a decreased consumption of lard in these countries, but the world level of prices of nearly all fats and oils has been reduced in order to move the increased supply into consuming channels. Lard prices have declined since 1926. Prices of other fats and oils have shown similar declines. Just what effect a continued high level of consumption of vegetable, fish, marine oils, and fats will have on the international lard situation in the future is uncertain. It is probable, however, that lard production and the international lard trade will continue to fluctuate more in response to changes in hog production than to changes in the production of other fats and oils.

FACTORS AFFECTING UNITED STATES EXPORTS OF HOG PRODUCTS TO VARIOUS COUNTRIES

United Kingdom

The United Kingdom is the most important customer of the United States for both pork and lard. Although the relative importance of the United Kingdom in our export trade of hog products has decreased somewhat during the last 30 years, that country took 46 per cent of the United States lard exports, 48 per cent of the bacon exports, and 82 per cent of the exports of hams and shoulders during the marketing year which began October 1, 1930. United States lard exports to the United Kingdom during 1930-31 totaled 261,900,000 pounds, bacon exports amounted to 20,537,000 pounds, and exports of hams and shoulders amounted to 73,607,000 pounds.

Bacon.- Bacon imports into the United Kingdom since 1900 are shown in Figure 8. In the lower half of that figure it will be observed by an examination of the shaded portions of the segmented bars that from 1900 to 1914 the trend of bacon imports into the United Kingdom from the United States was gradually downward, and although such imports increased materially during the war years, they have decreased sharply since 1918. In 1931, imports of United States bacon into the United Kingdom amounted to only 21,000,000 pounds or 2 per cent of the total bacon imports into that country. Total imports of bacon in the United Kingdom, on the other hand, have increased greatly since 1920. Although most of the increase has been in takings of bacon from Denmark (our principal competitor in the British market), imports from other continental countries also have increased, and in 1931, the total imports into the United Kingdom amounting to 1,215,000,000 pounds, were the largest on record.

In the upper half of Figure 8, imports from Denmark and the United States are expressed as a percentage of total British imports. The inverse relationship between the proportion of the imported supply furnished by Denmark and that furnished by the United States is marked throughout the 32-year period. The influence of Danish hog production upon our exports of hog products, which was discussed in the preceding section, has been almost entirely in the form of competition for the British bacon trade. From 1900 to 1914 when the proportion of imports from Denmark gradually increased, the proportion of the trade obtained by the United States decreased. Imports from Denmark dropped sharply during the war period reaching their low point in 1919 when only negligible quantities originated in that country. The declines in Danish hog production and in bacon exports from Denmark to the United Kingdom during the war years were due largely to the unfavorable conditions for shipping in the English channel which almost entirely cut off the importations of food into Denmark and the export movement of hog products from that country to British markets. The proportion of British supplies coming from the United States increased materially during that period. In 1918, over 80 per cent of the bacon imports into the United Kingdom were from this country. British imports from Denmark and other European countries have increased greatly during the postwar period, and as a result, imports from the United States have been sharply reduced. In 1931, only 2 per cent of the British bacon imports were of United States origin.

A decided prejudice against American bacon developed among British consumers in 1920 and 1921 as a result of the wartime food control activities.

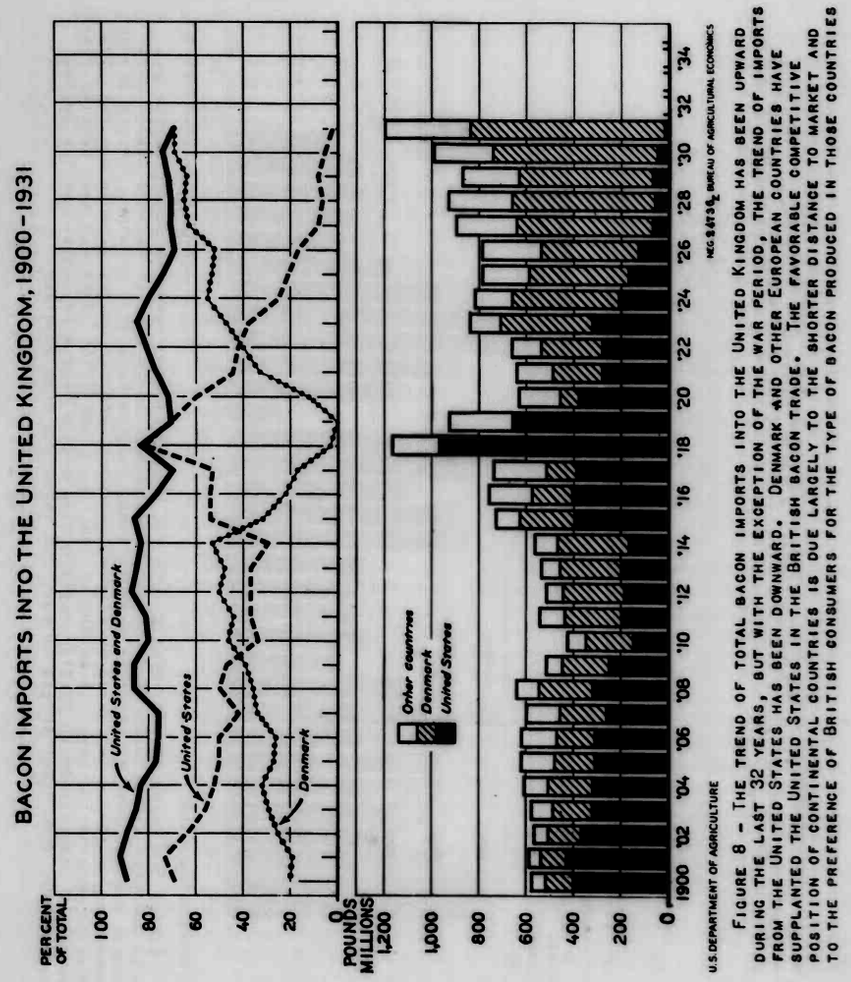


FIGURE 8 - THE TREND OF TOTAL BACON IMPORTS INTO THE UNITED KINGDOM HAS BEEN UPWARD DURING THE LAST 32 YEARS, BUT WITH THE EXCEPTION OF THE WAR PERIOD, THE TREND OF IMPORTS FROM THE UNITED STATES HAS BEEN DOWNWARD. DENMARK AND OTHER EUROPEAN COUNTRIES HAVE SUPPLANTED THE UNITED STATES IN THE BRITISH BACON TRADE. THE FAVORABLE COMPETITIVE POSITION OF CONTINENTAL COUNTRIES IS DUE LARGELY TO THE SHORTER DISTANCE TO MARKET AND TO THE PREFERENCE OF BRITISH CONSUMERS FOR THE TYPE OF BACON PRODUCED IN THOSE COUNTRIES

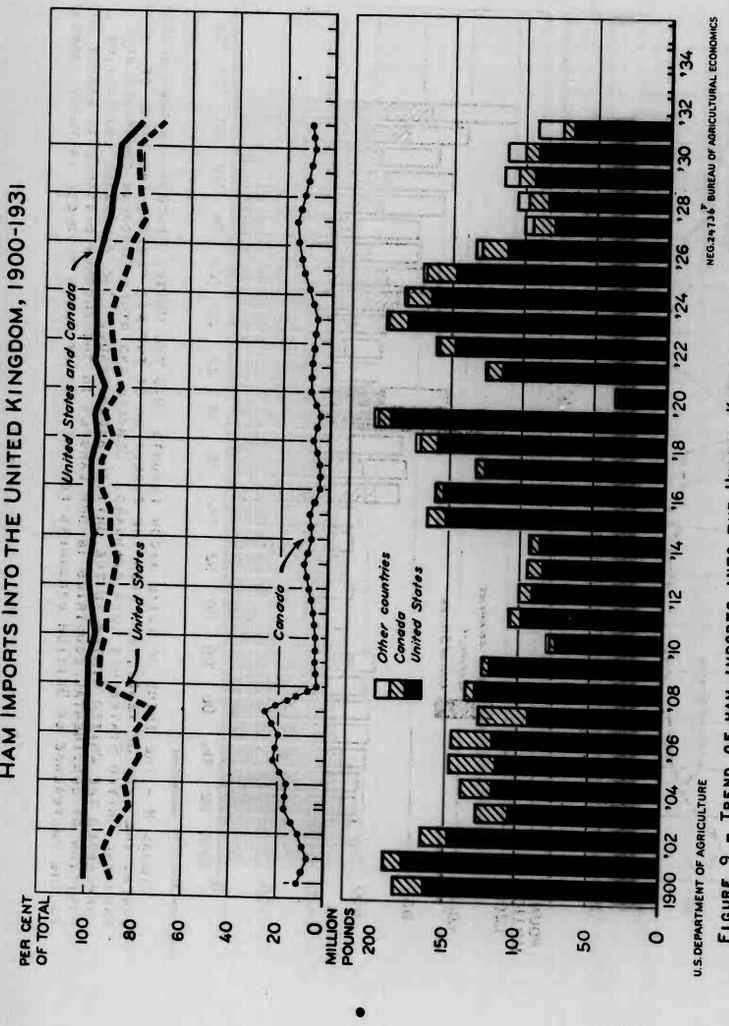


FIGURE 9 - TREND OF HAM IMPORTS INTO THE UNITED KINGDOM FROM THE UNITED STATES HAS BEEN DOWNWARD SINCE 1923. THE PROPORTIONATE REDUCTION IN BRITISH TAKINGS DURING THIS PERIOD HAS NOT BEEN SO GREAT AS THAT OF BACON IMPORTS FROM THIS COUNTRY. UNITED STATES CONTINUES TO SUPPLY THE MAJORITY OF HAMS IMPORTED INTO THE UNITED KINGDOM BUT THE PROPORTION ORIGINATING HERE HAS GRADUALLY DECLINED SINCE 1916. AMERICAN HAMS RECEIVE CONSIDERABLE COMPETITION IN BRITISH MARKETS FROM DANISH WILTSHIRE SIDES. IN THE UNITED KINGDOM THE TERM "HAM" REFERS TO BOTH THE FRONT AND HIND QUARTERS

Early in 1919 the food administrations of both the United States and Great Britain suspended their control over pork exports and imports, which had been established during the war. During the War the British Government had required that all pork shipped to the United Kingdom be strongly cured, because of the delays in shipping occasioned by wartime conditions. When Government control was suspended at the end of the War large quantities of pork were mildly cured for export to the United Kingdom. Since submarines and mines were no longer a menace and a source of delay to ocean traffic, it was expected that shipping facilities would be adequate, but in the summer of 1919 they became congested. As a result, in August, 1919 the British Food Ministry, anticipating a food shortage, resumed control of meat imports, and took over existing supplies. During the remainder of the year pork was exported to Great Britain in record quantities.

In the meantime, prices of nearly all commodities began to fall, but pork prices in Great Britain were maintained by the British Food Ministry. The result was that the greatly increased pork exports were moved into consumption very slowly. Storage stocks increased greatly, and storage facilities for the mildly cured pork were inadequate. Much spoilage occurred. In the face of such large storage accumulations imports of American pork into the United Kingdom were sharply restricted early in 1920. United States exports of all kinds of cured pork were much smaller during that year than in 1919. In February 1920 the American Institute of Meat Packers estimated that the British holdings of bacon and hams in storage and afloat were equivalent to a seven months' supply.

Throughout 1920 the British Food Ministry maintained prices of pork in Great Britain near wartime levels, despite the fact that the general level of all prices had declined greatly. Authorization by the Food Ministry of all importations of pork was required. Control over meat imports and meat prices was not relinquished by the British Government until May 1921.

The effects of this situation upon the American hog industry probably are not of great consequence in our trade at the present time, but they were of considerable importance from 1919 to 1921. The large exports in 1919 were doubtless responsible in a large measure for the very high hog prices which prevailed in most of that year. On the other hand the great decline in prices during the two following years was also due in part to decreased exports to the United Kingdom. Perhaps the most important effect was the great disfavor in which American pork was placed with British consumers. Much of the mildly cured pork exported in 1919 was sold in a very poor condition during 1920. Through no fault of the American hog producers or packers the reputation of American pork in the British market was severely affected by this situation.

The relatively favorable competitive position of Danish bacon in British markets is largely the result of many years of concentrated effort on the part of Danish farmers in developing their swine industry. In 1887, when a law was enacted in Germany prohibiting the importation of live and dressed hogs, Denmark was deprived of its principal foreign outlet, and the attention of Danish producers was thereby diverted to the United Kingdom. Representatives were sent to the British market to study consumer preferences, and on the basis of information so collected, extensive investigations were conducted for the purpose of determining the type of hog and method of curing and marketing which would yield a product that could be marketed in the United Kingdom to the best advantage. Cooperative bacon factories were established in order to provide a more efficient method of marketing and processing. The success of the cooperative movement is indicated by the fact that now more than 80 per cent of

the bacon exported from Denmark is produced from hogs slaughtered in cooperative factories. This unity of control in distribution has aided greatly in the production of a highly standardized product and one which conforms to British consumer requirements. 6/ Since about 1890, practically all of the hog products exported from Denmark have been marketed in the United Kingdom, and exports have been closely related to Danish hog slaughter.

Denmark has an additional advantage over the United States because of the short distance to the British market. The proximity of Denmark and the other European exporting countries to the United Kingdom makes it possible for those countries to export bacon with only a mild cure at a relatively low cost. Wiltshire sides are shipped to the United Kingdom from continental Europe in a semicured state and British importers are then able to adjust the final cure as the market desires it. Consumers in Great Britain prefer pork that is mildly cured.

In the United States the pork exporters' problem is much more difficult because of the longer distance to British markets. They have two alternatives in handling their shipments. A mildly cured product may be exported under low refrigeration with greater risks of spoilage and higher exporting costs; or a strong cure may be used which reduced transportation costs but which makes the pork less desirable in the British markets. For many years the former method of exporting has predominated. Although most of the pork exported is cured only mildly, the cure is stronger than that used in European exporting countries and somewhat stronger than desired by the bulk of the British trade. This problem in exporting was intensified in 1927 when the United Kingdom prohibited the use of boric acid as a preservative for meat. The use of boric acid has not been permitted in the curing of pork consumed in the United States and Germany for more than 20 years, but prior to 1927 its use facilitated the shipment of pork to the United Kingdom in a green or incompletely cured condition.

Another factor favorable to Danish pork in the United Kingdom is that the British trade can depend upon an adequate supply of Danish bacon of uniform quality. The British trade does not have the assurance of adequate supplies of American pork that it has in the case of Danish pork, and there has been little incentive to advertise, or through other means, to build up a demand for the American product.

Hams and Shoulders.- The trend of ham imports into the United Kingdom from the United States has been similar to that of bacon imports except that during the postwar years the proportionate reduction in takings has not been so great as that of bacon. (In the United Kingdom, the term "hams" refers to both hams and shoulders). The United States provides most of the hams imported into the United Kingdom. Figure 9. From 1908 to 1923 an average of about 90 per cent of the ham imports into the United Kingdom originated in the United States, but since that time the proportion has gradually declined as imports from Canada and some of the continental countries have increased. There is a distinct but limited demand for American hams in the United Kingdom, but considerable competition is encountered from Danish Wiltshire sides even though this competition is not so effective as in the case of bacon. Ham imports into the

6/ Danish bacon is exported in the form of Wiltshire sides. The Wiltshire side is the whole side of the carcass with head, backbone, aitchbone, and shoulderbone removed.

United Kingdom from the United States during 1931, amounting to 67,271,000 pounds, were 23 per cent below the 5-year 1910-to-1914 average takings, but bacon imports from the United States in 1931 were nearly 90 per cent below the prewar average.

An analysis of the principal factors related to United States exports of cured pork to the United Kingdom is shown in Figure 10. In this analysis, exports of bacon, hams, and shoulders have been combined since they are all included in the cuts defined as "bacon" which are imported from continental countries. A large portion of the variations in these cured pork exports to the United Kingdom can be accounted for by the variations in bacon imports from continental Europe and by changes in hog-slaughter supplies in the United States. There is some indication that a given change in bacon imports from continental Europe into the United Kingdom is associated with a small change in United States exports to that country when imports from the Continent are above average than when they are below average. Such a relationship would suggest that there is a distinct but limited demand for American cured pork in the United Kingdom, which is affected only remotely by supplies from other countries. The broken line at the lower end of the curve is intended to indicate, however, that the data are inadequate to warrant a statment that such a relationship actually exists. The year 1930 provided the only basis for determining the shape of this portion of the curve. As data for the current and subsequent years become available, the nature of this relationship can be more definitely ascertained. This analysis also indicates that while the United States tends to export larger quantities of pork to the United Kingdom when domestic slaughter increases, offerings of bacon from continental Europe is the more important factor. Pork production in Denmark dominates these offerings.

Lard.- Lard imports into the United Kingdom from 1900 to 1931 are shown in Figure 11. The trend has been gradually upward since 1900, although there has been considerable variation from year to year, especially during the World War. The United States furnished most of the lard to the United Kingdom during this period, the amount ranging from 78 to 97 per cent of the total imports. During the last 10 years, however, the proportion supplied by this country has been slightly smaller than it was just prior to the war. Canada is the principal competitor of the United States in the British lard trade. Takings from that country during recent years have been considerably larger than the prewar (1910-1914) average, but they still represent a small proportion of the total imports. The Danish bacon hogs yield only a small quantity of lard compared with the yield from American lard-type hogs and the principal foreign outlet for Danish lard is in Germany. The quantities of Danish lard received in British markets, therefore, are negligible.

United States lard, and other hog products as well, are shipped abroad largely on open consignment, the sales being made after arrival. Exporting costs of lard are smaller than those of pork. The product is usually shipped in the holds of vessels and artificial refrigeration is unnecessary. Most of the lard shipped to the United Kingdom is in the form of refined lard. Although the exact proportion which refined lard represents in the total movement is not known, importers in the British market estimate that it is well over 90 per cent. Imported lard in the United Kingdom is most popular in blocks of 28 pounds, packed two blocks to a box. It is handled in this form until it reaches the retailer, who cuts it into pound blocks, or other sizes, as his customers may wish.

The factors that govern the export movement of lard to the United Kingdom apparently are quite different from those that affect pork exports to that country and both pork and lard exports to other important countries. In contrast to the sharp reduction in imports of bacon and hams from the United States to the United Kingdom during the last decade, lard imports from the United States have been relatively stable, fluctuating slightly from year to year, but showing no distinct upward or downward trend.

During recent years, lard prices in Liverpool have not been greatly different from the prices of lard of comparable grade in Chicago. Thus, during much of this period, when transportation charges and other marketing costs are taken into account, the prices of lard exported to the United Kingdom have been lower than domestic prices. The lower returns from the lard exported to the United Kingdom have probably been at least partially offset by the strength given to domestic prices through the removal of a portion of the supply from the domestic market. Changes in domestic lard production account in part for the relatively small year-to-year variations in lard exports to the United Kingdom but it is apparent that there are other influences involved which as yet have not been measured. The superior quality accredited to American lard by British consumers, no doubt has aided in the maintenance of a fairly stable consumption of that product in the United Kingdom, even though it has been necessary also to reduce prices sharply. Furthermore, the British trade is assured of a uniform and adequate supply of American lard year after year, which also tends to give the United States a preferred position in the British lard markets, just as the same characteristic of Danish bacon gives Denmark an additional advantage in the bacon trade. The United State is the only country from which Great Britain can secure uniform supplies of lard in such quantities as those used in the latter country. The upward trend in imports of vegetable and animal fats and oils other than lard into the United Kingdom has not been so marked as in Germany and the United States. This may also have been a factor in maintaining the export movement of lard to that country. A more complete study of the British demand for American lard is needed to determine the relative importance of these various influences.

Germany

Germany ranks next to the United Kingdom as a purchaser of American hog products although about one-third of the hog supplies of Europe (excluding Russia and Turkey) is produced in that country. The most intensive hog-producing region of Germany is in the northwestern part of that country. There is a distinct division in that region between the hog breeder and the hog feeder. The feeder usually purchases the young pigs from the breeder and fattens them for slaughter chiefly on imported feeds. The hogs are fattened in a relatively short period of time, and are made ready for slaughter in approximately seven months. The other principal hog-producing region is in eastern Germany. In this region, the methods of hog production are more comparable to those in the commercial areas of the United States, in that hog breeding and feeding are usually conducted by the same farmer. The feed consists of home-grown feeds, principally potatoes and rye, and the fattening process is much slower than in northwestern Germany. There has been a greater increase in production during recent years in eastern Germany than in northwestern Germany. Grain and potato production has

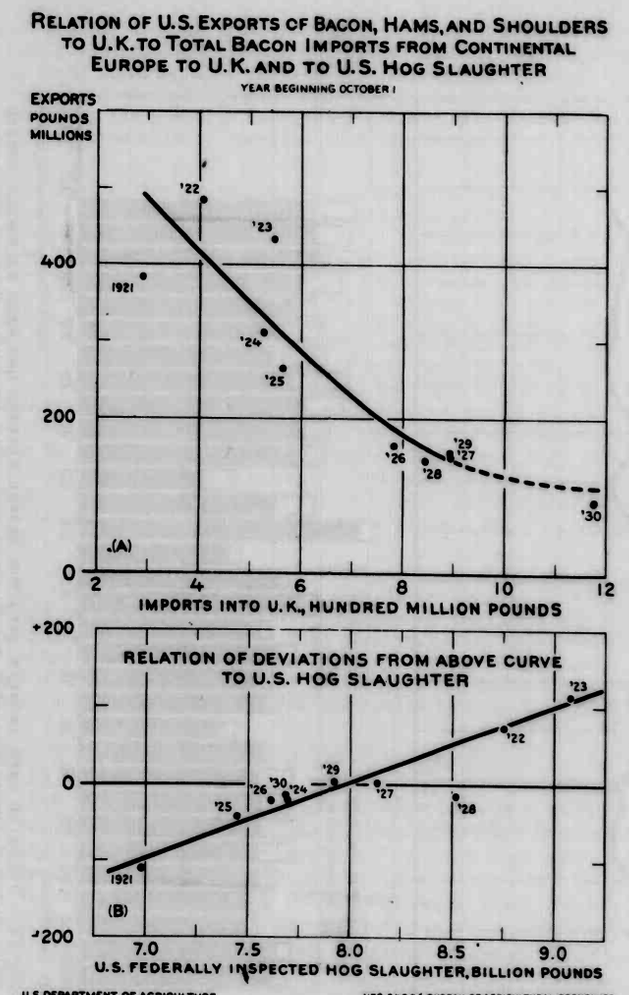


FIGURE 10 - A LARGE PROPORTION OF THE VARIATIONS IN CURED-PORK EXPORTS TO THE UNITED KINGDOM ARE ACCOUNTED FOR BY VARIATIONS OF BACON IMPORTS FROM CONTINENTAL EUROPE, AND CHANGES IN SLAUGHTER SUPPLIES IN THE UNITED STATES. IMPORTS FROM CONTINENTAL EUROPE, THE MORE IMPORTANT FACTOR, WERE LARGELY DETERMINED BY PORK PRODUCTION IN DENMARK DURING THIS 10-YEAR PERIOD

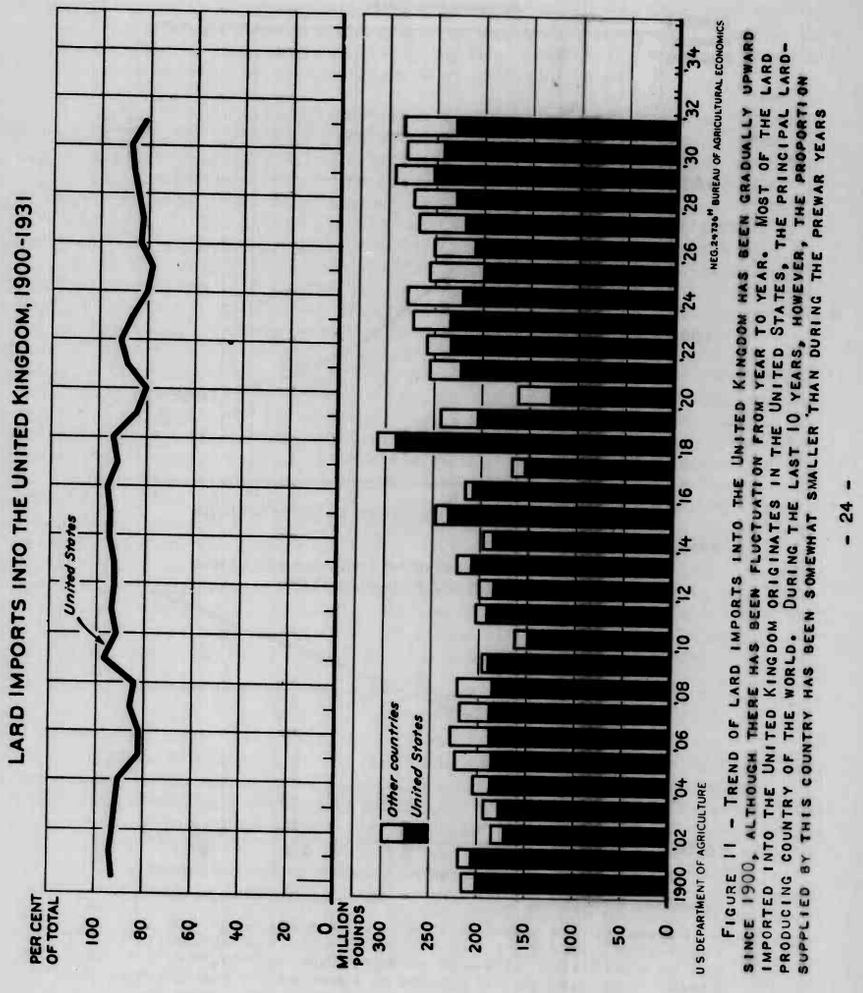


FIGURE 11 - TREND OF LARD IMPORTS INTO THE UNITED KINGDOM HAS BEEN GRADUALLY UPWARD SINCE 1900, ALTHOUGH THERE HAS BEEN FLUCTUATION FROM YEAR TO YEAR. MOST OF THE LARD IMPORTED INTO THE UNITED KINGDOM ORIGINATES IN THE UNITED STATES, THE PRINCIPAL LARD-PRODUCING COUNTRY OF THE WORLD. DURING THE LAST 10 YEARS, HOWEVER, THE PROPORTION SUPPLIED BY THIS COUNTRY HAS BEEN SOMEWHAT SMALLER THAN DURING THE PREWAR YEARS

increased sharply in that area and the most profitable outlet for these low-priced feeds has been through the production of pork. Increased tariff rates on feeds imported into northwestern Germany have tended to limit the expansion of hog production. The hogs produced in Germany are classed as a meat type, the yield of lard being greater than that of Danish hogs but much less than that of American lard-type hogs.

Lard.- Lard is the principal hog product exported from the United States to Germany. During the marketing year 1930-31, lard exports to Germany constituted about 95 per cent of the total movement of hog products from the United States to that country, and they represented 19 per cent of our total lard exports. Lard imports into Germany from 1900 to 1931 are shown in Figure 12. The United States supplies Germany with most of its imported lard, although since the World War an increasing proportion has been supplied by other countries, principally Netherlands and Denmark. In 1900, 99 per cent of the lard imports into Germany were from the United States, but by 1931 this proportion had declined to about 69 per cent. From 1900 to 1913 there was little indication of either an upward or a downward trend of lard imports into Germany, although takings fluctuated considerably from year to year. The smallest takings during this period were in 1910 when they amounted to only 129,000,000 pounds. No import data are available for the War years. Most of the imports into Germany were discontinued during this period. Since 1920 the trend of lard imports has been sharply downward.

The yearly variations in lard exports to Germany from 1921-22 to 1930-31 are accounted for largely by changes in inspected hog slaughter in Germany and the production of lard from federally inspected hog slaughter in the United States. (Fig. 13.) The range of the influence of each of these two factors on exports of lard to Germany indicates that they were about equally important during the period covered by the analysis.

Pork.- Nearly all the pork imported by Germany during the last 30 years has been in the form of bacon, and until recent years, practically all was supplied by the United States. Bacon imports into Germany were very small before the World War, but considerable quantities were purchased immediately following the War. During the calendar year 1921, bacon exports from the United States to Germany amounted to about 54,000,000 pounds, but as hog production in Germany expanded, bacon exports to Germany decreased sharply. During 1931 United States bacon exports to Germany were less than 5 per cent of the 1921 exports. Although bacon exports from other countries to Germany have been larger than those from the United States during recent years, total German takings of foreign bacon and other cuts of pork have been small. Exports of hams and shoulders from the United States to Germany are negligible.

Figure 14 contains an explanation of most of the variations in United States exports of bacon, hams, and shoulders to Germany from 1921-22 to 1930-31. Hog slaughter in Germany and Denmark explains most of the variation in these exports, but the latter are governed to some extent also

by hog slaughter in the United States. The relation of slaughter in Germany and Denmark to cured-pork exports from the United States as shown in the upper section of the illustration indicates that the effect of the foreign slaughter when such slaughter is small is much greater than when it is large.

Cuba

Cuba ranks third as a foreign market for United States hog products. During the year ended September 30, 1931, Cuban takings of lard from the United States were 8 per cent of the total exports of lard from this country, and United States exports of hams and shoulders to Cuba were 6 per cent of the total. Lard is by far the most important hog product imported into Cuba and practically all of the lard is purchased from the United States.

Swine are raised in all parts of the island by small producers, but local supplies are consistently below domestic requirements. The quality of hogs is very inferior and the yield of lard is extremely low. The difficulty encountered in controlling cholera and other disorders of swine on the island has been an important factor in keeping production at a relatively low level.

The tariff duty on American lard imported into Cuba was raised from 2.88 cents per pound to 4.31 cents on February 5, 1931, a surtax of 3 per cent of the duty was added in each case. On March 17, 1932 this duty was changed to 7.34 cents. On July 1, 1932 the duty was subject to a surcharge of 5 per cent, and the customs law provides that the surcharge is to be increased 5 per cent each year until July 1, 1936, when it will become 25 per cent, at which figure it will remain fixed. A 20 per cent preference is given imports from the United States, but even with this reduction the duty on United States lard as given above is considerably higher than it is on vegetable oils.

The quantity of United States lard exported to Cuba during the last 11 years has apparently been closely associated with the quantity of lard produced in this country and the purchasing power obtained from sugar in Cuba. The relative importance of these two factors is suggested in Figure 15. Sugar is the most important commodity produced in Cuba and economic conditions of the island are largely dependent upon the returns from sugar production. The value of the sugar crop was estimated from the reported production and the price of sugar at Havana. The actual value can not be considered as an index of purchasing power, however, since marked changes in the price level such as have occurred in the last two years not only affect the amount of money obtained from the sugar crop, but also affect the quantity of goods that amount of money will buy. Since no index of commodity prices in Cuba is available, it has been necessary to assume that the major shifts in the price level in Cuba and the United States have been fairly comparable during this 11-year period. On the basis of this assumption, the value of the Cuban sugar crop was adjusted for changes in the United States price level in order to get an approximation of the purchasing power of sugar on the island.

The relation of this index of purchasing power to United States lard exports to Cuba after removing the influence of domestic production is shown in Section B of Figure 15. It is impossible to determine how much of the reduction in exports during 1931 was due to decreased purchasing power and how

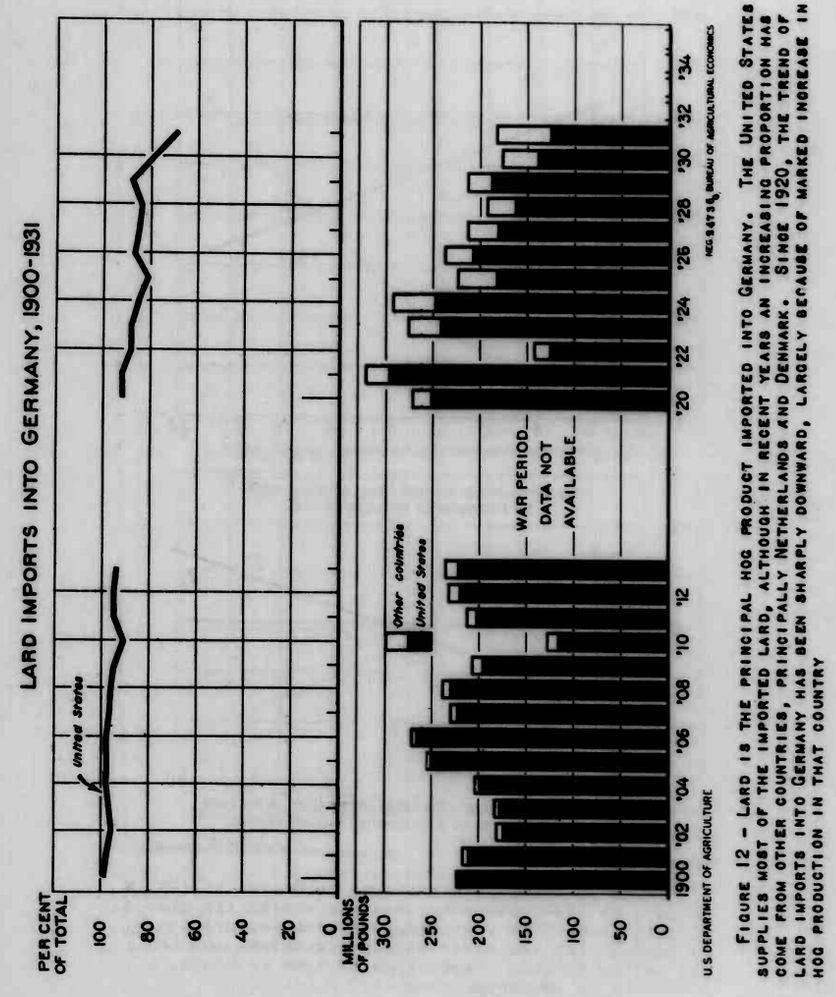
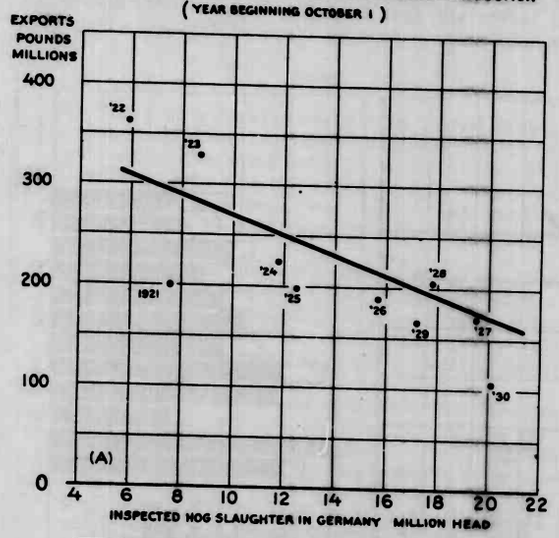


FIGURE 12 - LARD IS THE PRINCIPAL HOG PRODUCT IMPORTED INTO GERMANY. THE UNITED STATES SUPPLIES MOST OF THE IMPORTED LARD, ALTHOUGH IN RECENT YEARS AN INCREASING PROPORTION HAS COME FROM OTHER COUNTRIES, PRINCIPALLY NETHERLANDS AND DENMARK. SINCE 1920, THE TREND OF LARD IMPORTS INTO GERMANY HAS BEEN SHARPLY DOWNWARD, LARGELY BECAUSE OF MARKED INCREASE IN HOG PRODUCTION IN THAT COUNTRY

RELATION OF UNITED STATES EXPORTS OF LARD TO GERMANY TO HOG SLAUGHTER IN GERMANY AND TO U.S. LARD PRODUCTION

(YEAR BEGINNING OCTOBER 1)



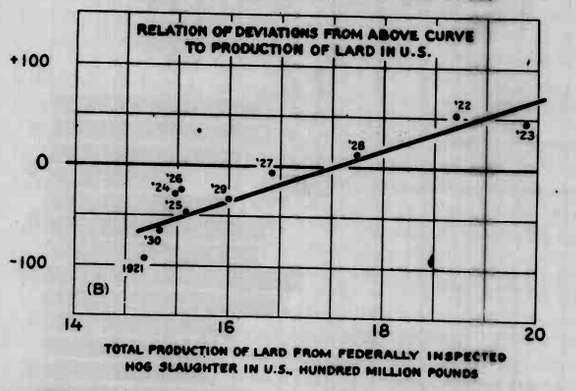


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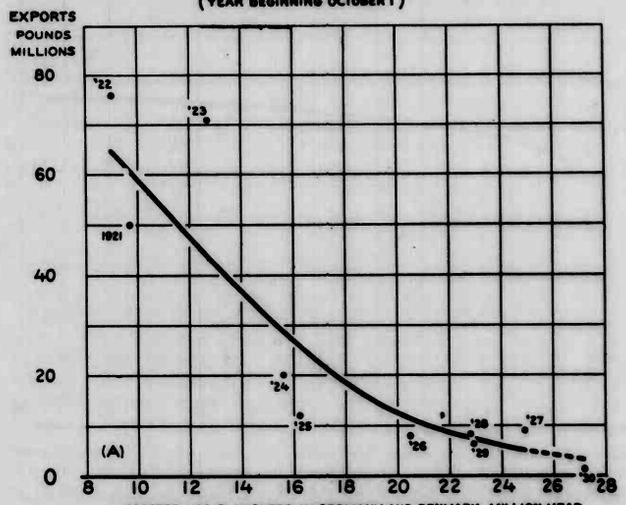
FIGURE 13 - YEARLY VARIATIONS IN UNITED STATES EXPORTS OF LARD DURING THE POSTWAR PERIOD ARE EXPLAINED LARGELY BY VARIATIONS IN LARD PRODUCTION IN GERMANY (AS INDICATED BY HOG SLAUGHTER) AND IN THE UNITED STATES. PRODUCTION OF LARD IN OTHER COUNTRIES IS RELATIVELY SMALL

RELATION OF U.S. EXPORTS OF BACON, HAMS, AND SHOULDERS TO GERMANY TO HOG SLAUGHTER IN GERMANY AND DENMARK AND TO U.S. HOG SLAUGHTER

(YEAR BEGINNING OCTOBER 1)



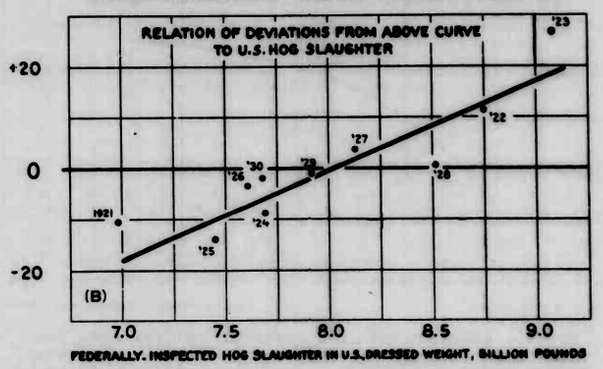


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FIGURE 14 - THE YEAR-TO-YEAR CHANGES IN CURED-PORK EXPORTS FROM THE UNITED STATES TO GERMANY FROM 1921 TO 1930 WERE CLOSELY ASSOCIATED WITH CHANGES IN HOG SLAUGHTER IN GERMANY AND DENMARK AND VARIATIONS IN SLAUGHTER SUPPLIES IN THE UNITED STATES. THE RELATION OF EXPORTS TO SLAUGHTER IN GERMANY AND DENMARK INDICATES THAT EFFECT OF FOREIGN SLAUGHTER ON EXPORTS WHEN SUCH SLAUGHTER IS SMALL, IS MUCH GREATER THAN WHEN IT IS LARGE

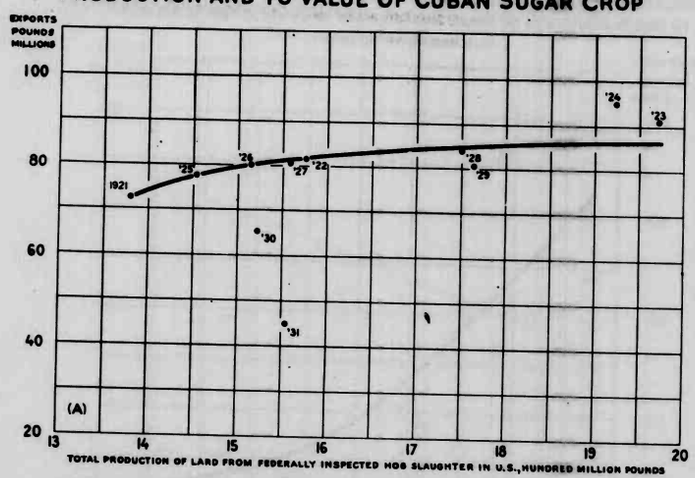

FIGURE 15 - QUANTITY OF LARD EXPORTED TO CUBA FROM THE UNITED STATES SINCE 1921 HAS BEEN CLOSELY ASSOCIATED WITH QUANTITY OF LARD PRODUCED IN THIS COUNTRY AND PURCHASING POWER OF THE CUBAN SUGAR CROP, THE MOST IMPORTANT COMMODITY PRODUCED IN CUBA. DECREASED RETURNS FROM CUBAN SUGAR CROP IN 1931 APPARENTLY WERE RESPONSIBLE FOR MUCH OF THE REDUCTION IN TAKINGS OF UNITED STATES LARD THAT YEAR, ALTHOUGH THE NEW TARIFF ACT IN CUBA, EFFECTIVE IN FEBRUARY, 1931, EXERTED SOME INFLUENCE

much was due to the increased tariff duties and other factors, since in no other year during the period were returns from the sugar crop so low as in 1931. It is probable that the decrease in the purchasing power of sugar was the major influence.

Canada

Notwithstanding the relatively minor importance of the Canadian swine industry, Canada is of some importance in the international trade for hog products. During 1931 approximately 6 per cent of the total hog products from slaughter under inspection in Canada were exported. Imports of hog products, most of which usually come from the United States, were equivalent to about 3 per cent of the Canadian inspected hog slaughter in 1931. Canadian imports of pork from the United States are not reexported but are used to fill the gap left in the home supplies by exportation of high grade Canadian cured pork as Wiltshire sides. In 1931 the proportion of the total United States exports of each hog product going to Canada amounted to 26 per cent for pickled pork, 6.3 per cent for cured pork, 3 per cent for fresh pork and 1.5 per cent for lard. Exports of live hogs from the United States to Canada are prohibited by an embargo. Hogs and hog products are imported from Canada into the United States to a very limited extent. Prior to 1930 when the present tariff duties went into effect, a considerable number of hogs were imported from Canada. In 1927 nearly 200,000 head were imported, but by 1931 the number was negligible. Shipments of hogs from Canada have been largely from the prairie provinces of Saskatchewan and Alberta to the northwestern part of the United States, which is a deficit hog production area in most years. In addition to the direct trade between the United States and Canada for hogs and hog products, Canadian hog production has a further effect on our export trade because of the competition of Canadian hog products with those of the United States on the British market. This competition is of some significance in the case of hams, shoulders and lard, as indicated in a previous section of this report in the discussion of factors affecting United States exports of hog products to the United Kingdom.

Other Countries

Although exports of hog products to the United Kingdom, Germany, and Cuba constitute most of the total export movement from the United States, limited quantities of pork and lard are exported to several other countries. In recent years, Netherlands has been the most important of these countries, although some trade has been carried on with numerous others, including Belgium, France, Norway, and Italy.

Netherlands is usually on an export basis for most pork products, but some bacon and lard is exported each year to that country from the United States. A considerable portion of these exports are reexported to other European countries, but statistics of reexports are not reported officially. For the year ended September 30, 1931 lard exports to Netherlands amounted to 4 per cent of the total United States lard exports. Data on hog slaughter in Netherlands are imcomplete, but there is considerable evidence to indicate that hog-production trends in that country are similar to those in Germany and Denmark. It seems probable, then, that the factors affecting United States exports of pork products have been much the same as those affecting pork and lard exports to Germany. In recent years the variation in the United States exports of lard to Netherlands have been similar to the changes in the lard exports to Germany.

PROSPECTIVE TRENDS IN FOREIGN HOG PRODUCTION

Germany and Denmark

In appraising the outlook for our export trade in hog products in view of the foregoing relationships, there are two major problems to be considered: The probable trend of hog production in European countries and in the United States and the extent to which the relationships of hog production at home and abroad to exports during the last decade (1921-22 to 1930-31) are likely to continue during the next few years.

In Figure 16, it is shown that hog slaughter in both Germany and Denmark has had two distinct types of change during recent years. One is the steady upward trend in slaughter and the other is the marked tendency for slaughter to fluctuate in cycles of three to five years in length. These cycles in hog slaughter in foreign countries, as well as in the United States, are closely related to the ratio of hog prices to feed prices. That is, when hog prices are high relative to feed prices, hog production increases, and the increase in production is reflected in larger slaughter supplies eighteen months to two years later; and when hog prices are low relative to feed prices, slaughter supplies are reduced in a similar length of time. It may be observed in Figure 16 that hog-feed ratios in Germany and Denmark have been unfavorable to hog production since early 1931, and that marketings in those countries are apparently at or near the peak of a cycle. Recent census returns from those countries indicate that hog-breeding operations have been reduced sharply since the middle of 1931.

The probable cyclical changes in production are very important in considering the outlook for hog production in Germany and Denmark during the next two or three years; but with regard to the long-time outlook, it is more important to know whether the marked upward trend in production, which has prevailed since 1920, will continue. This involves a consideration of the economic position of hog production in the agriculture of the country. A given level of hog prices might discourage production in one country because of more favorable opportunities in other lines of production, but in another country it might cause hog production to be maintained or even expanded as a result of limited opportunities for shifting to the production of other agricultural products.

It has already been stated that hog production in Denmark during the last decade has been closely associated with dairy production and that the trend in both has been sharply upward. (Fig. 16) The future trend of hog production in Denmark, therefore, is largely dependent upon the trend in dairying. Dairy production in Denmark and the marketing of dairy products has been developed to a high state of efficiency. Although returns from dairying have been greatly reduced during the last two years it is doubtful that alternative opportunities in Danish agriculture provide much, if any, incentive for a marked shift from dairy production to the production of other commodities. The number of milk cows and heifers on farms July 15, 1931 was larger than that of the corresponding date a year earlier. But the increase during the 12-month period was somewhat smaller than that of the preceding years. This indicates that while dairy production continued to increase during 1930-31, the increase was at a decreasing rate compared with that from 1924 to 1930. Whether dairy production will continue to increase during the next few years is not clearly

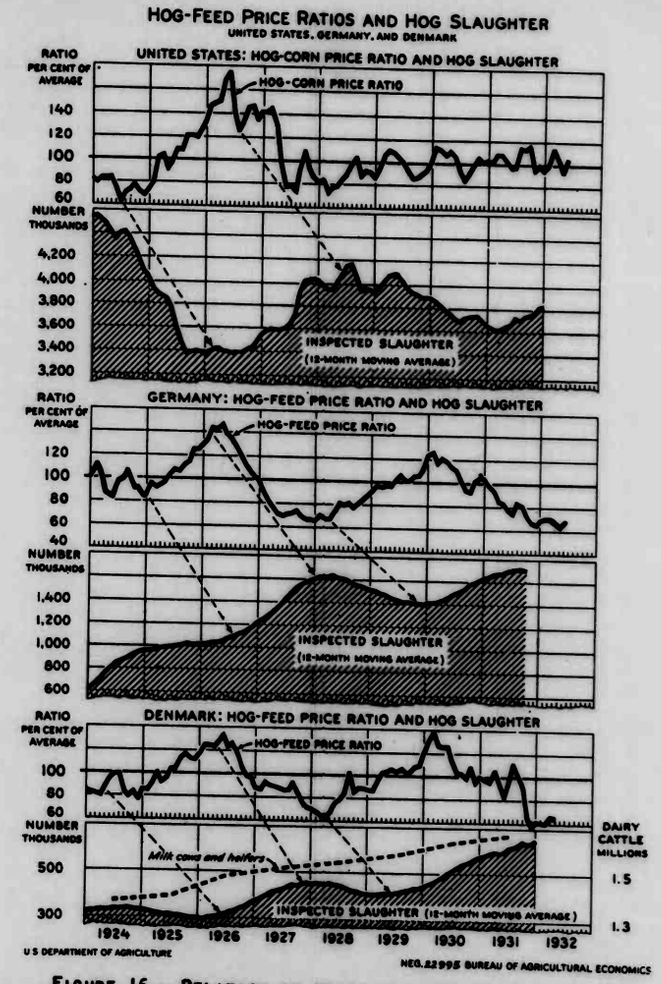

FIGURE 16 - RELATION OF PRICE OF HOGS TO PRICE OF FEED CREATES CYCLICAL CHANGES IN HOG PRODUCTION IN THE UNITED STATES AND OTHER IMPORTANT HOG-PRODUCING COUNTRIES. THE RELATION BETWEEN CYCLES IN THE HOG-FEED RATIOS AND THOSE IN HOG SLAUGHTER IS INDICATED BY THE SLANTING ARROWS. IN GERMANY AND DENMARK THE HOG-FEED RATIOS DECLINED SHARPLY DURING 1931, AND AS A RESULT, HOG PRODUCTION IS DECREASING IN THOSE COUNTRIES. THERE HAS BEEN A MARKED UPWARD TREND IN HOG PRODUCTION IN GERMANY AND DENMARK SINCE THE WAR

indicated by information at hand, but it seems likely that any increase which may occur will be much less marked than that which occurred during the last decade. Thus it appears that a continuation of the marked upward trend of hog production in that country is not likely, and that changes in production during the next decade probably will be largely cyclical around the level of the last few years, these fluctuations occurring in response to cyclical changes in the relationship between hog prices and feed prices.

The sharp upward trend in hog production in Germany during the last decade has brought the hog population in that country to a level somewhat higher than that which existed immediately prior to the World War and it is doubtful that this rate of expansion will continue. Developments in the industry during the next few years depend greatly upon the future trade policy in that country. Germany is not producing enough pork and lard to meet domestic requirements even though production is at the highest level on record. Imports of pork products represent about 5 per cent of the total consumption. However, the production of from one-fourth to one-third of the hogs in that country is made possible only by the importation of feeds. The problem confronting Germany, therefore, is to determine whether larger quantities of feed should be imported and imports of hog products reduced, or feed imports reduced and hog product imports increased. Present indications are: (1) That production will continue far above the level that prevailed from 1920-1924, and (2) that any upward trend in this production during the next 10 years will be at a much slower rate than that of the last decade.

Netherlands and Poland

It is unlikely that hog production in the less-important foreign producing countries as a whole will increase materially during the next few years. In Netherlands, where the trend in production has been similar to that in Germany and Denmark during recent years, a sharp decrease in breeding operations is indicated by the 1932 census returns in that country.

Poland has recently supplanted the Netherlands as the second most important continental source of bacon in the British market. With a very unfavorable foreign outlet for live hogs due largely to difficulties of exchange transactions in Austria, the principal foreign purchaser of Polish hogs, a larger proportion of Poland's surplus is being disposed of in the form of meat. Poland has made concerted efforts during the last two years to obtain a favorable position in the British bacon trade. Such efforts have included the development of export standards for pork, sales promotion work and the payment of export premiums by the Government. Polish hog marketings have been relatively large during the last year and returns to producers have been unfavorable despite the Government's subsidy to the industry. Although there is no definite evidence concerning the direction of the trend of hog-breeding operations in that country, the recent trend of marketings and the unfavorable returns from the industry during the last year indicate that production is decreasing.

Canada

Hog production in Canada, although usually in excess of domestic consumption requirements, is relatively small. In 1931 inspected hog slaughter in that country amounted to 2,243,000 head, which was only one-twentieth as large as the federally inspected hog slaughter in the United States for that year. The production of swine in Canada has been, to a

large extent, a subordinate enterprise, but production has been increasing during the last 30 years. This upward trend has been due largely to an increase in hog numbers in the more recently developed Prairie Provinces, since the hog population in the eastern Provinces, where numbers of hogs are greatest, has been relatively stable during the present century. The growth of dairy production has been an important factor in the increase in hog production. The increase in barley production and decreased sheep production also have been contributing factors to the expansion of hog numbers in some provinces.

A large proportion of the hogs produced in Canada are of bacon type. During 1931 about 54 per cent of the 2,848,000 head of hogs graded at stockyards and packing plants, were bacon hogs. The production of bacon type hogs has been encouraged by the Canadian Department of Agriculture, and other agricultural agencies in the country, and considerable improvement in the quality of the hogs produced has occurred during recent years. However, the bacon produced in Canada is not so high in quality as the Danish and Irish bacon with which it competes on the British markets. The difficulties involved in the curing of pork for export are much the same as those encountered in the United States.

During the first half of the postwar decade considerable interest was evidenced in the bacon export trade, and swine production increased rapidly until 1925. From 1926 to 1930 production declined, and exports declined from 1926 to 1931. A marked increase in hog production occurred in 1931, however, and during the first half of 1932, hog marketings and exports of hog products were much larger than those of the corresponding period in 1930 and 1931. Lard exports were about twice as large as in the first half of 1931, and exports of bacon and hams during the period were over four times larger than in the corresponding period of the preceding year. Most of the pork and lard exported went to the United Kingdom.

The feed grain situation in Canada is of considerable significance in an appraisal of the prospective trends of hog production in that country. Hog production in eastern Canada, where the majority of the hogs are now located, is largely dependent upon outside sources for feed. Freight rates on feed grains, largely barley, produced in western Canada are appreciably lower when shipments are made for export than when they are made for domestic consumption. This tends to place hog producers in eastern Canada in a relatively unfavorable position, and it has been partly responsible for the fact that in recent years corn has been imported into Canada from Argentina and South Africa, while barley produced in western Canada was being exported or stored. Another unfavorable factor in the hog situation in eastern Canada during the last two decades, has been the shift from cream and butter production to fluid milk production, which has made a smaller amount of dairy by-products available as feed for hogs.

In western Canada (in the Prairie Provinces) barley production has increased greatly during the last 20 years. Much of this increased production has been exported, but in the last two years exports of barley have decreased to less than half their former volume, owing largely to a greater production of feed grains in Europe and to increased duties on barley importations in various European countries. Approximately 85 per cent of the barley produced in Canada, most of which is feeding barley, is grown in the Prairie Provinces where only 35 per cent of the hogs of

Canada are located. The prospects for the production of other grains in Canada are about as unfavorable as the barley situation, so there seems little likelihood that there will be any marked shift from barley to wheat or rye in the near future.

In view of these facts it appears probable that the upward trend in production which prevailed in the western Provinces prior to 1927 will be resumed. This increase may be marked if the agreement between Great Britain and Canada reached at the British Imperial Economic Conference at Ottawa in August of this year is ratified. The agreement provides for a liberal quota of Canadian pork in British markets. This would, of course, intensify the competition encountered by the United States in supplying hog products to the British market.

Russia

Despite the efforts of Russia to expand hog production greatly, there is apparently little likelihood of Russian pork products becoming important in the international pork trade during the next few years. There was a marked decline in hog numbers in Russia during 1930 owing to the wholesale slaughter of animals by the peasants who were taken into the collective farms during the winter and early spring of that year. The hog population was reduced about 50 per cent during 1929 and 1930. In an attempt to offset this unfavorable development, the Soviet Government undertook the organization of large State livestock farms and special collective livestock farms. Pedigreed stock were concentrated on the State farms where an effort has been made to improve native breeding stock. According to recent reports, the expansion program is progressing very slowly. Heavy death losses have occurred because of inadequate equipment, disease, and inefficient management. It is apparent that Russia is much interested in developing its hog industry and a greater export trade in hog products. Eventually, therefore, some increase in pork exports may occur, but it probably will be several years, at least, before that country will become an important factor in the international pork trade.

Other Countries

An increased interest in hog production has been manifested during the last two or three years in the Baltic countries, Sweden, France, Czechoslovakia, Italy, Argentina, and a few other countries, but present indications are that production in those countries will be reduced during the next two or three years, or that the increase which may occur in a few of them will not exert a significant influence on our export trade. Developments over a longer period of time are uncertain at present.

NEW DEVELOPMENTS AFFECTING UNITED STATES EXPORTS OF HOG PRODUCTS

Reasoning solely from the standpoint of slaughter supplies of hogs in the United States and in foreign countries, present indications point to an increase in exports of United States hog products during the next two years. It should be recognized, however, that even though practically all of the variations in exports during the period covered in this study have been associated with changes in domestic and foreign supplies, there is the possibility that the same relationships may not prevail in subsequent years because of the introduction of new factors or a shift in the relative importance of the old factors.

Several recent developments indicate that reduced foreign supplies during the next year or two may not stimulate exports to the extent as from 1921 to 1931. Trade and financial regulations, adopted in countries important in the American pork and lard trade since September 1931, promise to be of much greater significance in their effects on international trade in pork and lard than previous postwar developments of this nature. Abandonment of the gold standard by Great Britain and Denmark during the autumn of 1931 has intensified the competition from Denmark in the British pork and lard trade. Since the abandonment of the gold standard, British prices of American bacon in terms of gold have been relatively lower than prices of Danish bacon in terms of Danish currency. The advantages gained by Denmark as a result of the exchange situation, however, should be viewed as being largely of a temporary character since Danish hog producers must purchase the bulk of their feed on foreign markets with a depreciated currency.

Competition with Canada in British pork markets may be further intensified if the agreement with Canada drawn at the British Imperial Economic Conference at Ottawa during August 1932 is ratified. The agreement provides that in any legislation which may be submitted for regulating the supplies of bacon and hams imported by the United Kingdom, Canada will be permitted free entry of such products of good quality up to a maximum of 280,000,000 pounds per annum. It would require considerable time for Canadian farmers to increase hog production sufficiently to take full advantage of such a quota, but as indicated earlier in this report, there is a possibility of a marked increase in hog production in Canada.

New trade restrictions and increased tariff duties on pork and lard have been adopted in a number of importing countries during 1932. The duties imposed on bacon in the Irish Free State have almost entirely eliminated the American pork trade with that country. Import duties on lard in Germany were nearly doubled in July 1932. Lard imports into Germany during the year have also been restricted by a marked reduction in the volume of foreign exchange available for lard. There is now considerable agitation for placing lard imports on a quota basis in that country. Increased duties on hog products also have been adopted in Cuba, Italy, Mexico and several other countries during the year.

Developments in the general economic situation in the United States and in foreign countries might also tend to disrupt the normal relationships between production and exports during the next few years. If changes in the business situation and in the general level of commodity prices should prove to be more favorable in the United States than in Europe it would probably result in smaller exports of hog products than the relationships in the foregoing analysis would indicate.

Even if these various restrictions were not involved in the pork and lard export situation the cyclical reduction in foreign slaughter supplies which is in prospect will not be sufficient to provide an outlet for American hog products during the next year or two equal to that of the average of the last 10 years. Over a longer period of time it is not unlikely that Europe as a whole will become more self-sufficient in pork production and that the downward trend in United States exports of pork will continue.

Since the type of hogs produced in European countries is not likely to be changed materially and since the pork produced in those countries is preferred by British consumers, pork exports probably will continue to be affected more adversely than lard exports by European hog production. The Corn Belt States are especially well adapted to the production of lard type hogs in comparison with hog producing sections in other countries. The minimum of difficulties involved in the physical handling of lard in export trade, the superior qualities of American lard and its established position in Europe also are factors that favor lard as the principal American hog product in foreign markets. Therefore, if the United States is to continue to produce an exportable surplus of hog products the surplus should remain largely in the form of lard despite the competition from other oils and fats.

APPENDIX

Table 1.- Pork and lard Exports from the United States, 1900-1931

Year	Exports 1/			Ratio of pork exports to lard exports	Percentage of production	
	Total pork and lard	Pork	Lard		Pork	Lard
	Million pounds	Million pounds	Million pounds		Per cent	Per cent
1900	1,462	847	615	1.38	14.3	38.0
1901	1,471	859	612	1.40	14.6	37.9
1902	1,148	641	507	1.26	12.0	35.2
1903	1,110	569	541	1.05	10.4	36.2
1904	1,156	585	571	1.02	10.0	35.8
1905	1,392	684	708	.97	11.9	45.6
1906	1,418	733	685	1.07	12.3	41.7
1907	1,209	615	594	1.04	9.7	33.4
1908	1,219	632	587	1.08	9.6	32.8
1909	947	485	462	1.05	8.1	30.7
1910	706	324	382	.85	5.7	26.6
1911	1,080	470	610	.77	7.1	36.5
1912	1,014	456	558	.82	7.1	34.3
1913	1,049	468	581	.81	7.1	34.6
1914	858	393	465	.85	6.0	28.1
1915	1,407	913	494	1.85	13.1	27.8
1916	1,485	1,022	463	2.21	13.8	25.0
1917	1,329	941	388	2.43	15.3	24.9
1918	2,273	1,714	559	3.07	21.8	28.2
1919	2,667	1,878	789	2.38	24.0	38.7
1920	1,572	929	643	1.44	12.5	31.3
1921	1,662	759	903	.84	9.9	42.7
1922	1,526	727	799	.91	8.8	33.9
1923	2,035	960	1,075	.89	10.0	38.6
1924	1,721	735	986	.75	7.9	35.9
1925	1,268	549	719	.76	6.7	32.3
1926	1,159	426	733	.58	5.2	31.5
1927	1,033	316	717	.44	3.7	30.4
1928	1,135	334	801	.42	3.6	30.9
1929	1,245	379	866	.44	4.1	33.3
1930	988	314	674	.47	3.6	28.8
1931	794	193	601	.32	2.2	25.2

Compiled from "Statistics of Meat Production, Consumption and Foreign Trade of the United States," Preliminary report, Bureau of Agricultural Economics.

1/ Exports include shipments to non-contiguous territories.

Table 2.- Hogs: Number and inspected slaughter in the United States, Germany and Denmark, 1907-1932

Year	United States		Germany		Denmark	
	Number 1/	Slaughter 2/	Number 3/	Slaughter 4/	Number 5/	Slaughter 4/
	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head
1907	57,300	32,885	22,147	16,398	-	-
1908	61,300	38,643	-	16,508	-	-
1909	57,000	31,395	-	15,593	1,468	
1910	49,300	26,014	-	16,335	-	-
1911	55,700	34,133	-	18,616	-	2,211
1912	55,700	33,053	-	18,217	-	2,434
1913	54,000	34,199	21,924	17,893	-	2,405
1913			6/	16,429	-	---
1914	51,800	32,532	25,659	19,441	2,497	2,656
1914				7/	2,715	
1915	57,000	38,381	25,341	13,293	-	2,594
1916	59,700	43,084	17,287	6,548	-	2,542
1917	56,700	33,910	17,002	5,795	-	2,479
1918	61,200	41,214	8/ 10,778	2,430	621	324
1919	63,800	41,812	10,271	6/ 1,368	716	456
1920	60,159	38,019	11,518	3,024	8/ 1,116	930
1921	58,912	38,982	14,153	6,825	1,430	1,641
1922	59,849	43,114	15,818	6,923	1,899	2,215
1923	69,304	53,334	14,678	5,833	2,855	3,414
1924	66,576	52,873	17,308	10,257	2,868	4,024
1925	55,770	43,043	16,895	12,090	2,517	3,766
1926	52,085	40,636	16,200	13,072	3,122	3,868
1927	55,468	43,633	19,424	17,279	3,731	5,098
1928	61,772	49,795	22,899	19,480	3,363	5,373
1929	58,789	48,445	20,106	17,252	3,616	4,994
1930	55,301	44,266	19,944	17,994	4,872	6,182
1931	54,374	44,772	23,365	20,488	5,473	7,320
1932	9/ 59,511		23,800			

1/ Estimates of numbers of swine on farms as of January 1 by the Division of Crop and Livestock Estimates, Bureau of Agricultural Economics.
2/ From reports of the Bureau of Animal Industry.
3/ From official sources based on census of December of the preceding year.
4/ From official sources.
5/ From official sources based on census of July 15 of the current year.
6/ Change in boundaries.
7/ 1914 estimate for present boundaries.
8/ For this and subsequent years estimates are for new boundaries.
9/ Preliminary.

Table 3.- Estimated total disappearance of important edible vegetable oils in the United States and net imports including animal fats and oils other than lard and butter, into the United Kingdom and Germany, 1921-1931

Year	United States, estimated total disappearance 1/	United Kingdom, net imports 2/	Germany, net imports 3/
	1,000 pounds	1,000 pounds	1,000 pounds
Average			
1921-1925	1,693,296	870,150	4/ 768,194
1926-1930	2,348,829	950,814	1,125,331
1921	1,570,244	823,670	5/
1922	1,563,783	810,267	915,313
1923	1,532,379	879,414	617,597
1924	1,666,060	889,847	611,140
1925	2,134,015	947,550	928,225
1926	2,175,724	908,639	1,009,703
1927	2,285,501	857,300	1,035,348
1928	2,298,257	944,914	1,129,614
1929	2,492,669	1,024,051	1,211,809
1930	2,491,994	1,019,167	1,240,180
1931	2,115,328	1,024,817	1,304,296

1/ Compiled from Bureau of Census reports. Total disappearance estimate represents total quantity of oil going directly into trade channels or used for manufacture of other products. That the figures might be more comparable, all oils except olive oil, were expressed in terms of crude oil. Oils included were: cottonseed; peanut; olive, edible; coconut; and corn.

2/ Compiled from Annual Statements of the Trade of the United Kingdom. Net imports were computed by deducting exports and reexports from total imports. Oleaginous raw materials were converted to an oil-equivalent basis. All vegetable oils except olive oil, were expressed in terms of crude oils. The fats, oils, and raw materials included were: oleomargarine, lard imitation, fish and marine oils, coconut oil, cottonseed oil, peanut oil, olive oil, palm kernel oil, margarine, cottonseed, sesame, peanuts, palm kernels, and copra.

3/ Compiled from Der Auswartige Handel Deutschlands. Net imports were computed by deducting exports and reexports from total imports. Oleaginous raw materials were converted to an oil-equivalent basis. The fats, oils, and raw materials included were: oleomargarine, animal tallow, stearine, fish oils, peanut oil, cottonseed oil, palm kernel oil, coconut oil and butter, oleine, margarine and margarine mixtures, olive oil, peanuts, sesame, palm kernels, and copra.

4/ Four year average only.

5/ Not available for 1921.

Table 4.- Bason: Imports into the United Kingdom, 1900 to 1931 1/

Year	From the United States	From Denmark	From other countries	Total	Percentage of total: United States	Denmark	United States and Denmark
	Thousand pounds	Thousand pounds	Thousand pounds	Thousand pounds	Per cent	Per cent	Per cent
1900	401,870	115,175	63,816	580,861	69.2	19.8	89.0
1901	433,502	110,010	48,310	591,822	73.2	18.6	91.8
1902	367,792	140,630	61,625	570,047	64.5	24.7	89.2
1903	324,073	167,563	85,947	577,583	56.1	29.0	85.1
1904	314,284	193,075	103,300	610,659	51.5	31.6	83.1
1905	310,826	164,829	142,469	618,124	50.3	26.7	77.0
1906	310,903	163,955	145,916	620,774	50.1	26.4	76.5
1907	255,432	202,377	143,139	600,948	42.5	33.7	76.2
1908	320,131	229,545	87,127	636,803	50.3	36.0	86.3
1909	245,174	203,691	70,187	518,052	47.3	39.1	86.4
1910	146,375	200,975	85,350	432,700	33.8	46.4	80.2
1911	203,598	237,674	104,027	545,299	37.3	43.6	80.9
1912	190,215	259,695	69,109	519,019	36.6	50.0	86.6
1913	201,978	261,514	80,592	544,084	37.1	48.1	85.2
1914	170,571	304,059	96,355	570,985	29.9	53.3	83.2
1915	395,315	231,081	104,222	730,618	54.1	31.6	85.7
1916	415,551	170,569	178,557	764,677	54.3	22.3	76.6
1917	388,314	125,793	221,461	735,568	52.8	17.1	69.9
1918	963,276	2,407	202,356	1,173,039	82.5	.2	82.7
1919	660,074	744	266,676	927,494	71.2	.1	71.3
1920	376,574	78,856	173,073	628,503	59.9	12.5	72.4
1921	281,050	207,167	147,653	635,890	44.2	32.6	76.8
1922	275,897	264,738	123,766	664,401	41.5	39.8	81.3
1923	316,810	395,423	126,074	838,307	37.8	47.2	85.0
1924	205,388	446,562	163,183	815,133	25.2	54.8	80.0
1925	166,924	418,749	201,135	786,808	21.2	53.2	74.4
1926	133,181	407,857	247,125	788,163	16.9	51.7	68.6
1927	71,801	569,140	257,103	898,044	8.0	63.4	71.4
1928	60,240	602,089	267,022	929,351	6.5	64.8	71.3
1929	71,075	557,427	243,337	871,839	8.2	63.9	72.1
1930	53,574	685,244	253,558	992,376	5.4	69.1	74.5
1931	20,969	821,978	372,222	1,215,169	1.7	67.6	69.3

Compiled from data in "Annual Statement of the Trade of the United Kingdom" and converted to United States equivalents.

1/ Reexports not deducted. Excludes imports from Irish Free State.

Table 5.- Ham: Imports into the United Kingdom, 1900-1931 1/

Year	From the United States	From Canada	From other countries	Total	Percentage of total: United States	Canada	United States and Canada
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	Per cent	Per cent	Per cent
1900	163,999	20,727	401	185,127	88.6	11.2	99.8
1901	178,840	12,960	443	192,243	93.0	6.7	99.7
1902	147,031	18,360	625	166,016	88.6	11.1	99.7
1903	105,187	22,120	522	127,829	82.3	17.3	99.6
1904	116,778	22,034	516	139,328	83.8	15.8	99.6
1905	114,560	32,723	367	147,650	77.6	22.2	99.8
1906	117,121	28,503	284	126,857	80.3	19.5	99.8
1907	93,189	33,258	410	126,857	73.5	26.2	99.7
1908	130,995	5,898	332	137,225	95.5	4.3	99.8
1909	120,240	6,002	209	126,451	95.1	4.7	99.8
1910	74,567	4,214	1,761	80,542	92.6	5.2	97.8
1911	99,378	6,977	584	106,939	92.9	6.5	99.4
1912	91,840	8,347	375	100,562	91.3	8.3	99.6
1913	85,184	10,089	486	95,759	89.0	10.5	99.5
1914	86,778	6,606	565	93,949	92.4	7.0	99.4
1915	152,771	12,988	52	165,811	92.1	7.8	99.9
1916	154,935	6,389	115	161,439	96.0	3.9	99.9
1917	126,194	5,608	377	132,179	95.5	4.2	99.7
1918	158,929	12,396	2,829	174,154	91.3	7.1	98.4
1919	192,457	8,373	2,243	203,073	94.8	4.1	98.9
1920	31,762	2,887	1,678	36,327	87.4	7.9	95.3
1921	114,520	10,518	1,418	126,256	90.5	8.3	98.8
1922	147,903	10,793	1,827	160,523	92.1	6.7	98.8
1923	181,475	12,802	1,397	195,674	92.7	6.5	99.2
1924	165,226	16,344	1,654	183,234	90.2	8.9	99.1
1925	146,685	21,112	2,110	169,907	86.3	12.4	98.7
1926	112,041	18,224	3,596	133,661	83.7	13.6	97.3
1927	80,204	14,975	5,905	101,084	79.3	14.8	94.1
1928	85,101	12,911	7,495	105,507	80.7	12.2	92.9
1929	94,260	10,986	9,983	115,229	81.8	9.5	91.3
1930	91,385	9,412	11,342	112,639	81.6	8.4	90.0
1931	67,271	8,119	17,699	93,089	72.3	8.7	81.0

Compiled from data in "Annual Statement of the Trade of the United Kingdom" and converted to United States equivalents.

1/ Reexports not deducted.

Table 6.- Lard: Imports into the United Kingdom and Germany 1900-1931

Year	United Kingdom 1/: Total	From the United States	United States as a percentage of total	Germany 2/: Total	From the United States	United States as a percentage of total
	1,000 pounds	1,000 pounds	Per cent	1,000 pounds	1,000 pounds	Per cent
1900	215,855	200,770	93.0	224,198	221,769	98.9
1901	220,221	203,310	93.7	215,904	210,709	97.6
1902	184,893	172,229	93.2	181,379	174,119	96.0
1903	194,072	178,083	91.8	182,924	178,176	97.4
1904	205,054	187,040	91.2	204,239	199,739	97.8
1905	225,378	186,033	82.5	254,874	251,104	98.5
1906	229,529	189,430	82.5	271,427	266,468	98.2
1907	220,095	189,245	86.0	231,053	223,330	96.7
1908	222,599	186,285	83.7	239,644	230,812	96.3
1909	197,185	190,801	96.8	206,760	196,460	95.0
1910	162,679	150,445	92.5	128,722	117,063	91.0
1911	204,149	192,561	94.3	212,796	202,969	95.4
1912	200,535	186,276	92.9	233,956	221,345	94.6
1913	224,600	209,327	93.2	236,745	223,065	94.2
1914	197,692	187,314	94.8	3/	3/	
1915	247,569	235,063	94.9	3/	3/	
1916	216,589	209,056	96.5	3/	3/	
1917	168,022	154,504	92.0	3/	3/	
1918	309,165	289,553	93.7	3/	3/	
1919	243,974	205,372	84.2	3/	3/	
1920	162,008	128,755	79.5	272,077	251,581	92.5
1921	254,903	222,923	87.5	322,324	297,361	92.3
1922	257,526	234,474	91.0	144,125	126,306	87.6
1923	272,787	234,709	86.0	275,803	242,912	88.1
1924	278,768	222,053	79.7	293,252	248,410	84.7
1925	255,819	200,211	78.3	224,843	181,542	80.7
1926	252,470	209,528	83.0	239,354	208,200	87.0
1927	258,468	220,291	82.1	213,283	180,992	84.9
1928	274,042	230,308	84.0	192,956	162,876	84.4
1929	293,548	252,907	86.2	212,780	186,680	87.7
1930	280,560	243,322	86.7	177,179	140,368	79.2
1931	284,527	231,311	81.3	183,071	125,504	68.6

1/ Imports into the United Kingdom compiled from data in "Annual Statement of the Trade of the United Kingdom" and converted to United States equivalents. Reexports not deducted.

2/ Imports into Germany from Auswartige Handel Deutschlands.

3/ Not available for war years, 1914 to 1919.

Table 7.- United States production and exports of hog products and hog slaughter in Germany and Denmark, 1921-22 to 1930-31

Year beginning Oct.	United States production, federally inspected 1/	United States exports of hog products 2/					
	Hog slaughter: dressed weight	Lard from hog slaughter	Pork and lard 3/	Pork 4/	Lard 5/	Bacon 6/	Hams and shoulders 7/
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
1921	6,975,049	1,490,434	1,375,789	624,629	751,160	307,147	260,505
1922	8,749,584	1,892,501	1,906,115	887,977	1,018,138	435,404	357,870
1923	9,039,005	1,986,318	1,871,038	838,332	1,032,736	408,253	351,456
1924	7,686,904	1,529,591	1,289,461	546,832	742,629	218,808	271,592
1925	7,445,413	1,542,771	1,183,343	465,947	717,396	208,770	207,486
1926	7,614,560	1,536,005	1,046,878	354,887	691,991	171,930	135,057
1927	8,132,825	1,656,105	1,073,541	340,274	733,267	160,261	128,882
1928	8,523,074	1,764,786	1,182,860	355,026	827,834	168,069	124,751
1929	7,919,508	1,600,140	1,101,217	339,310	761,907	144,396	128,255
1930	7,682,593	1,509,510	735,052	171,691	563,361	42,934	89,355

Year beginning Oct.	United States exports of hog products 2/					Inspected hog slaughter	
	To the United Kingdom			To Germany			
	Bacon 6/	Hams and shoulders 7/	Lard 5/	Bacon, hams and shoulders 8/	Lard 5/	Germany 9/	Denmark 9/
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 head	1,000 head
1921	162,561	220,112	249,893	49,967	199,700	7,620	2,057
1922	191,481	293,191	253,999	75,932	362,179	5,891	3,106
1923	149,719	281,839	236,363	70,795	328,568	8,702	3,964
1924	94,221	218,102	220,252	20,231	224,401	11,795	3,832
1925	87,763	177,121	239,250	12,123	198,378	12,495	3,374
1926	51,758	113,686	212,121	7,872	138,927	15,636	4,857
1927	43,007	106,604	236,463	8,873	170,000	19,532	5,381
1928	47,484	97,512	238,080	8,190	205,356	17,829	4,943
1929	48,191	102,788	240,305	6,203	166,136	17,200	5,716
1930	20,537	73,607	261,900	1,203	106,209	20,054	7,115

1/ From reports of the Division of Livestock Meats and Wool Bureau of Agricultural Economics.
2/ From "Monthly Summary of Foreign Commerce of the United States".
3/ Includes bacon, hams and shoulders, pork (fresh, pickled, and canned) and lard (pure and neutral).
4/ Includes bacon (cumberland sides) hams and shoulders (wiltshire sides) and pork (fresh, pickled and canned).
5/ Includes neutral lard. 6/ Includes Cumberland sides.
7/ Includes Wiltshire sides. 8/ Includes Cumberland and Wiltshire sides.
9/ Compiled from official sources.

Table 8.--Hog-feed ratios in the United States, Germany and Denmark, by months, 1924 to 1931

Year and month	United States 1/		Germany 2/		Denmark 2/	
	Hog-corn ratio	Percentage of average 1925-1930 (11.4)	Hog-feed ratio	Percentage of average 1925-1930 (7.5)	Hog-feed ratio	Percentage of average 1925-1930 (9.47)
		Per cent		Per cent		Per cent
1924						
Jan.	9.33	81.8	7.5	100.0	7.95	83.9
Feb.	9.03	79.2	8.4	112.0	7.82	82.6
Mar.	9.51	83.4	7.9	105.3	7.74	81.7
Apr.	9.51	83.4	6.6	88.0	7.55	79.7
May	9.50	83.3	6.3	84.0	8.20	86.6
June	8.63	75.7	6.2	82.7	9.06	95.7
July	7.02	61.6	7.4	98.7	9.37	98.9
Aug.	8.00	70.2	7.5	100.0	9.40	99.3
Sept.	8.43	73.9	7.9	105.3	7.88	83.2
Oct.	8.98	78.8	6.7	89.3	7.57	79.9
Nov.	8.05	70.6	6.8	90.7	7.86	83.0
Dec.	7.79	68.3	6.1	81.3	7.33	77.4
1925						
Jan.	8.38	73.5	6.4	85.3	8.12	85.7
Feb.	9.07	79.6	7.2	96.0	8.01	84.6
Mar.	11.60	101.8	6.9	92.0	8.60	90.8
Apr.	11.92	104.6	7.1	94.7	9.49	100.2
May	10.45	91.7	7.3	97.3	8.72	92.1
June	11.14	97.7	7.8	104.0	9.02	95.2
July	12.52	109.8	8.1	108.0	9.78	103.3
Aug.	12.41	108.9	8.0	106.7	9.79	103.4
Sept.	13.82	121.2	8.4	112.0	10.72	113.2
Oct.	13.76	120.7	8.6	114.7	11.10	117.2
Nov.	13.62	119.5	9.4	125.3	10.70	113.0
Dec.	14.34	125.8	9.4	125.3	10.60	111.9
1926						
Jan.	15.27	133.9	9.7	129.3	11.08	117.0
Feb.	16.69	146.4	10.0	133.3	11.80	124.6
Mar.	17.04	149.5	10.8	144.0	11.80	124.6
Apr.	17.24	151.2	10.7	142.7	11.59	122.4
May	19.19	168.3	11.1	148.0	12.04	127.1
June	20.01	175.5	10.4	138.7	12.61	133.2
July	15.98	140.2	10.1	134.7	11.68	123.3
Aug.	14.31	125.5	9.7	129.3	11.98	126.5
Sept.	15.23	133.6	9.1	121.3	11.34	119.7
Oct.	16.56	145.3	8.5	113.3	9.91	104.6
Nov.	16.71	146.6	8.0	106.7	9.32	98.4
Dec.	15.41	135.2	7.7	102.7	9.16	96.7
1927						
Jan.	16.16	141.8	7.4	98.7	8.40	88.7
Feb.	16.13	141.5	6.7	89.3	8.22	86.8
Mar.	16.46	144.4	6.1	81.3	8.78	92.7
Apr.	15.03	131.8	5.7	76.0	8.58	90.6
May	11.06	97.0	5.3	70.7	8.50	89.8
June	8.88	77.9	5.2	69.3	8.34	88.1

Continued

Table 8.--Hog-feed ratios in the United States, Germany and Denmark, by months, 1924 to 1931 - continued

Year and month	United States 1/		Germany 2/		Denmark 3/	
	Hog-corn ratio	Percentage of average 1925-1930 (11.4)	Hog-feed ratio	Percentage of average 1925-1930 (7.5)	Hog-feed ratio	Percentage of average 1925-1930 (9.47)
Cont'd		Per cent		Per cent		Per cent
1927						
July	8.87	77.8	5.3	70.7	8 20	86.6
Aug.	8.28	72.6	5.4	72.0	8.12	85.7
Sept.	10.53	92.4	5.6	74.7	8.74	92.3
Oct.	12.37	108.5	5.2	69.3	7.90	83.4
Nov.	10.62	93.2	5.0	66.7	7.12	75.2
Dec.	9.67	84.8	5.0	66.7	6.73	71.1
1928						
Jan.	9.27	81.3	4.9	65.3	6.68	70.5
Feb.	8.51	74.6	5.3	70.7	6.41	67.7
Mar.	8.16	71.6	5.1	68.0	6.10	64.4
Apr.	8.75	76.8	5.1	68.0	6.04	63.8
May	8.95	78.5	5.5	73.3	6.38	67.4
June	9.62	84.4	6.1	81.3	7.16	75.6
July	10.05	88.2	6.0	83.0	7.50	79.2
Aug.	11.30	99.1	6.1	81.3	7.92	83.6
Sept.	11.89	104.3	5.8	77.3	9.68	102.2
Oct.	9.97	87.5	6.1	81.3	8.14	86.0
Nov.	10.51	92.2	6.3	84.0	8.44	89.1
Dec.	10.37	91.0	6.6	88.0	8.44	89.1
1929						
Jan.	9.91	86.9	6.9	92.0	8.32	87.9
Feb.	10.84	95.1	7.3	97.3	8.26	87.2
Mar.	12.17	106.8	7.2	96.0	8.94	94.4
Apr.	12.68	111.2	7.3	97.3	9.70	102.4
May	12.43	109.0	7.2	96.0	9.80	103.5
June	11.78	103.3	7.6	101.3	10.02	105.8
July	11.31	99.2	8.0	106.7	9.80	103.5
Aug.	10.42	91.4	7.6	101.3	10.07	106.3
Sept.	9.75	85.5	7.6	101.3	9.68	102.2
Oct.	9.87	86.6	7.9	105.3	9.82	103.7
Nov.	10.30	90.4	7.9	105.3	10.29	108.7
Dec.	10.62	93.2	8.4	112.0	10.38	109.6
1930						
Jan.	11.51	101.0	9.3	124.0	11.40	120.4
Feb.	13.01	114.1	9.5	126.7	12.50	132.0
Mar.	12.71	111.5	8.8	117.3	13.12	138.5
Apr.	12.20	107.0	9.1	121.3	11.98	126.5
May	12.68	111.2	8.9	118.7	11.89	125.6
June	12.05	105.7	8.5	113.3	11.90	125.7
July	10.65	93.4	8.3	110.7	10.69	112.9
Aug.	9.68	84.9	7.6	101.3	9.74	102.9
Sept.	10.38	91.1	7.0	93.3	9.68	102.2
Oct.	11.39	99.9	6.9	92.0	9.30	98.2
Nov.	12.04	105.6	7.7	102.7	10.28	108.6
Dec.	11.49	100.8	7.8	104.0	8.92	94.2

Continued

Table 8.--Hog-feed ratios in the United States, Germany and Denmark, by months, 1924 to 1931 - continued

Year and month	United States 1/		Germany 2/		Denmark 3/	
	Hog-corn ratio	Percentage of average 1925-1930 (11.4)	Hog-feed ratio	Percentage of average 1925-1930 (7.5)	Hog-feed ratio	Percentage of average 1925-1930 (9.47)
1931		Per cent		Per cent		Per cent
Jan.	11.75	103.1	7.8	104.0	9.52	100.5
Feb.	11.58	101.6	7.3	97.3	9.20	97.1
Mar.	12.43	109.0	7.0	93.3	9.04	95.5
Apr.	12.45	109.2	6.3	84.0	9.96	105.2
May	11.61	101.8	6.2	82.7	9.08	95.9
June	11.02	96.7	5.8	77.3	7.78	82.2
July	11.14	97.7	5.5	73.3	8.95	94.5
Aug.	13.08	114.7	6.3	84.0	10.60	111.9
Sept.	12.9	113.2	6.1	81.3	9.61	101.5
Oct.	13.3	116.7	5.4	72.0	8.60	90.8
Nov.	10.8	94.7	5.0	66.7	6.24	65.9
Dec.	11.3	99.1	4.9	65.3	5.47	57.8
1932						
Jan.	10.8	94.7	5.2	69.3	5.88	62.1
Feb.	11.4	100.0	5.3	70.7	5.80	61.2
Mar.	13.0	114.0	5.3	70.7	5.75	60.7
Apr.	11.8	103.5	5.1	68.0	6.25	66.0
May	10.6	93.0	4.9	65.3	6.20	65.5
June	12.0	105.3	5.2	69.3		
July	14.4	126.3				
Aug.	13.2	115.8				
Sept.	13.3	116.7				
Oct.						
Nov.						
Dec.						

1/ The hog-corn ratio for the United States is based on the average price of hogs at Chicago and the price of No. 3 Yellow corn at Chicago.

2/ The hog-feed ratio for Germany was computed by Dr. Arthur Hanau of the Institut fur Konjunkturforschung, Berlin. The ratios from 1925 to 1930 are published in Vierteljahnshefte zur Konjunkturforschung, Sonderheft 18. Later data have been furnished by Dr. Hanau through Assistant Agricultural Commissioner Christy, at Berlin. For the year 1924 the ratios were computed using method of Dr. Hanau with certain necessary adjustments. The ratio is based on the price of heavy hogs at Berlin and the prices of corn, barley, and potatoes in Germany, weighted according to their importance in hog ration.

3/ The hog-feed ratio for Denmark is simple average of the pork-corn ratio and the pork-barley ratio, based on Copenhagen prices. Prices of pork were used since no price of live hogs is available for Denmark.

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In the preparation of this report the authors drew upon numerous publications for the historical and descriptive material contained herein. In most of these publications pork and lard exports have been considered either in conjunction with the total export trade for all meats and meat products of the United States, or as a part of studies of the American hog industry. An attempt has been made to bring together as much of the available information as was considered pertinent to the present and prospective situation in our export trade for hog products. Publications given in the following list have proved helpful. Without making specific references we wish to acknowledge indebtedness for any material obtained from them.

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